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ABSTRACT

A handbook, created for both designers and users of food service facilities in schools, provides reference information and guidance for making sure schools can provide quality food service. The handbook's first six chapters include explanations on how to start a school food service design project; required space, including kitchen work flow and materials that should be used and why; equipment recommendations and locations; heating, ventilation, and air conditioning requirements; and ideas on writing food service equipment specifications. Remaining chapters address what information is needed for designing food service facilities during renovations, additions, and new construction; and tips for non-architects on what architects do and how to read architectural drawings. Appendices provide a glossary of terms, a resource list, a sample checklist for plan approval of food service, and a facility planning data sheet. (GR)

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The New
DESIGN HANDBOOK
for School Food Service

ED 432 881

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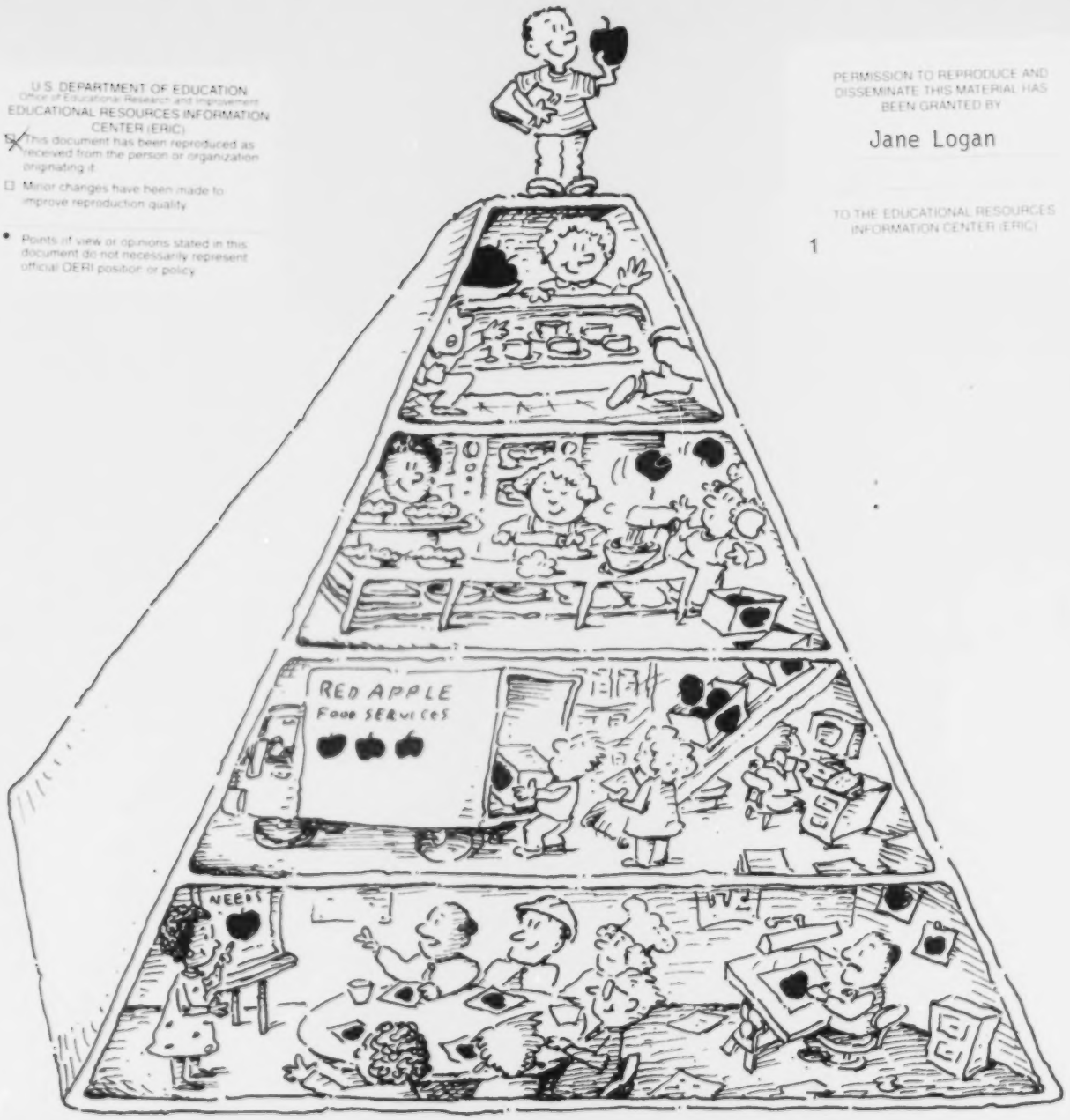

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THE NEW
DESIGN HANDBOOK

NATIONAL FOOD SERVICE MANAGEMENT INSTITUTE
THE UNIVERSITY OF MISSISSIPPI

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The University of Mississippi
Post Office Drawer 188
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June 1997

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BY
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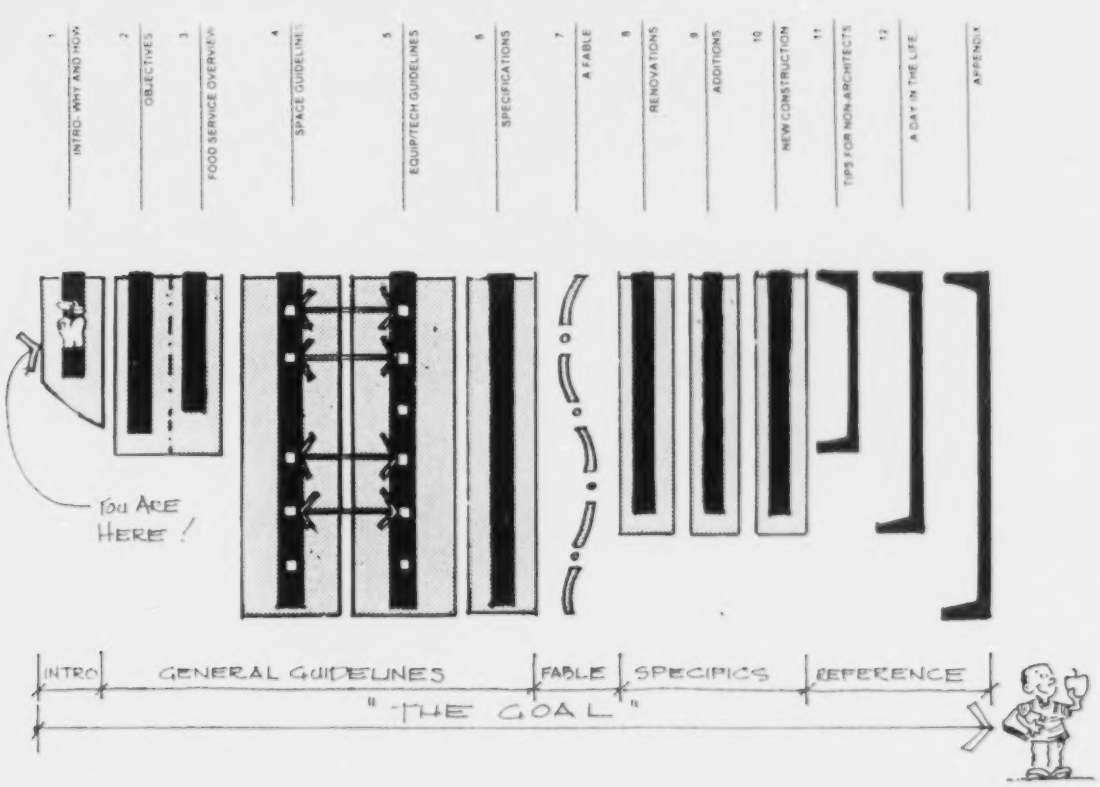
HOW THIS HANDBOOK IS ORGANIZED



The drawing above shows how this book is organized. The handbook is divided into two main sections with some additional information thrown in for good measure. The first section has basic information for use by everyone including general guidelines for space, equipment and specifications. The second section has specialized information according to project type (renovation, addition, new construction). Once you understand how things are organized, it should be a snap to use no matter what your project.

Don't be put off by the thickness of this document. There are a lot of pages because each topic has its own page. We hope this makes it easier for you to find and use the information you need quickly.

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ABOUT THIS HANDBOOK

The National Food Service Management Institute (NFSMI), The University of Mississippi is pleased to introduce you to the New Design Handbook! This handbook has been revised from the Alabama Child Nutrition Programs Design Handbook to meet the needs of a national audience as reached by the NFSMI.

There are lots of books about food service design, available equipment, school lunch programs, and so on, and so on, and so on. What is not available is one document which addresses the needs of both the designers and users of food service facilities in schools. That is, until now!

Notice we said both the designers and users of food service facilities. This book stresses teamwork and the great value of communication. **Because of this, we have tried to keep the technical 'jargon' to a minimum and the tone as user-friendly as possible.** Food service design is a complicated affair. This handbook will provide information on how to get started with food service design, what questions to ask, and whom to ask. Every school has its own needs and wants. This handbook is full of 'shoulds' and 'mays.' Except where state or federal law is a factor, we never say 'shall' or 'must.' This recognizes that every school system and food service program is different in some way. At the same time we know that anyone can benefit from the expertise of all. This handbook is a reference and a tool for you to gain access to the expertise of all in an effort to make your job easier. Food service professionals have many hats to wear and it is impossible to be an expert in all areas. It is important, though, that they be aware of the many options available to them in many areas; they must be informed to make the best decisions possible. Likewise, architects and equipment specialists must know the concerns and everyday needs of food service professionals to provide the very best facility design and food service equipment. Information included in this handbook has been compiled and reviewed by school food service personnel, architects, engineers, and food service consultants - all having many years of combined experience working on school food service projects. We hope having all of this "under one roof" will make it helpful to you whether you are an architect with many projects under your belt, a local superintendent planning a new school, or a district school food service supervisor tackling a small budget renovation. No matter who you are or what your goal, read on for some advice on how to best make this handbook work for you!

Susan Crowl Silberberg

ACKNOWLEDGEMENTS - ORIGINAL HANDBOOK

The 1994 Alabama Child Nutrition Programs Design Handbook was prepared under the leadership of Auburn University Department of Architecture:

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The New Design Handbook

National Food Service Management Institute
The University of Mississippi
1997

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SO, WHY USE THIS HANDBOOK?

Well, we can think of a number of reasons:

- It just might save you a lot of time
- You may find out something you did not know
- The charts and checklists are helpful in making sure "all the bases are covered"
- Good food service design makes for happy clients (and the students are the bottom line here) and a nice work environment
- You may avoid costly mistakes you'll have to live with for years to come.
- The cartoons in it might make you laugh

- And last, use this Handbook so you never have to reach this point....

WHAT EACH CHAPTER CONTAINS, IN A NUTSHELL

We suggest that you give this Handbook the 'once over' from cover to cover to familiarize yourself with its contents. If you don't have time for skimming the book (and who has lots of time these days?), read the Table of Contents. And, of course, reading this chapter will help save time in the long run.

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This front section includes a page on how the Handbook is organized so you can get a quick feel for the layout of this book. It also includes the Table of Contents, a note about the Handbook, and Acknowledgements.

1

INTRO- WHY AND HOW

This is self-explanatory. We hope this does a good job of explaining book organization, use of icons, etc.

2

OBJECTIVES

This explains the objectives of the Child Nutrition Programs, the importance of planning and communication in achieving those objectives, and the role of the team players in working towards these objectives.

3

FOOD SERVICE OVERVIEW

This gives help in getting started on a project: what information must be decided right away and how do you make decisions. Checklists are included here to make sure "all the bases are covered."

4

SPACE GUIDELINES

This chapter tells you everything you ever wanted to know on planning food service operation spaces (from square footage requirements to how the work in a kitchen flows to what materials should be used and why).

5

EQUIP/TECH GUIDELINES

Chapter 5 provides the remainder of everything you ever wanted to know on food service operation regarding equipment recommendations and location; heating, ventilation and air conditioning (HVAC); plumbing; electrical.

6

SPECIFICATIONS

This chapter contains some helpful hints and guidelines on writing food service equipment specifications.

WHAT THE ICONS IN THE MARGINS MEAN

7 — A FABLE

Chapters 4, 5 and 6 have an awful lot of information (useful, but overwhelming) so chapter 7 is to give you a break.

8 — RENOVATIONS

Just like it says, chapter 8 tells you all you need to know about renovations.

9 — ADDITIONS

If its an addition you're concerned with, this chapter is for you!

10 — NEW CONSTRUCTION

Lucky you, you get an entire new school! This chapter is for you.

11 — TIPS FOR NON-ARCHITECTS

Chapter 11 provides information on understanding what architects do and reading drawings. We even compare architect's services to food preparation!

12 — A DAY IN THE LIFE...

To understand what food service people do, we walk through a day in their lives.

APPENDIX

No, we don't mean the body part; but rather all that extra information you need such as the glossary and resources can be found in this chapter.

Of course we think everything in the handbook is important, but knowing how short we all are for time and how dreary these handbooks can get, ***we have used the following icons in the right hand margins to quickly grab your attention to important matters on each page.***

Warning!

Take note of something good!

Especially useful tip, shortcut, or rule of thumb

Cross reference to this page for additional info

1-3 — INTRO- WHY AND HOW

HOW EACH PAGE IS ORGANIZED

Topic for this page

Margin for you to write notes and where icons always appear (see previous page for description of icons).

Shaded boxes such as these generally contain definitions, clarifications or very important information.

Chapter number and page

Chapter title

1-4

INTRO- WHY AND HOW

Boxes like these appear throughout the book. They generally contain cartoons, drawings, or charts.

Handbook title

2 - OBJECTIVES

OBJECTIVES OF CHILD NUTRITION PROGRAMS

Child nutrition programs may have the following objectives:

- To provide meal services consistent with the nutritional needs of students. Such services shall include a reimbursable breakfast and lunch as required by regulations.
- To provide meal services that contribute to students' educational experiences.
- To provide meal services that contribute to the well-being of children enrolled in agency programs.
- To provide a resource handbook for school food service directors and architects to assist in planning and designing school food service facilities.

To facilitate these objectives, the National Food Service Management Institute has as its mission the following:

The National Food Service Management Institute is a catalyst for the continuous improvement of Child Nutrition Programs and services that promote healthy eating behaviors in children. As a national center, the Institute provides information, conducts applied research, and offers training and education opportunities using appropriate technology.

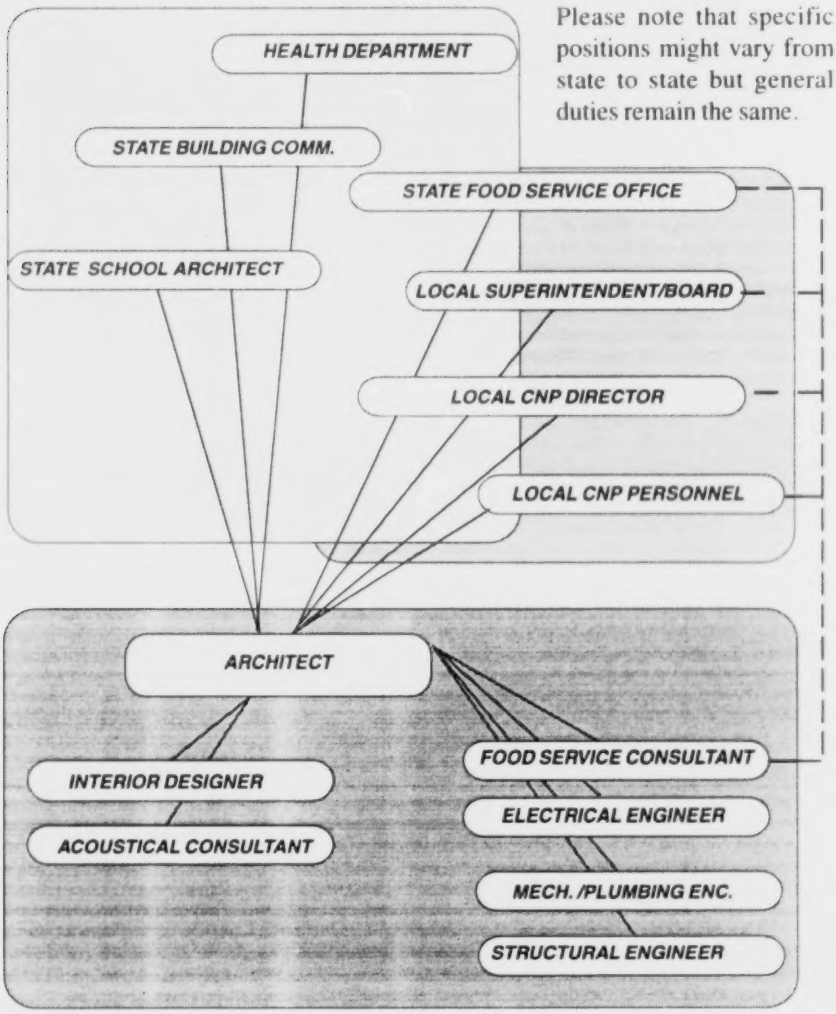
The Bottom Line:

Child nutrition programs provide nutritional meal service to all children because children whose lives are impeded by hunger and poor nutrition, regardless of socio-economic status, are not ready to learn.

The team must work together in the planning and in the design of a school food service facility in order to provide the students and staff with the space, equipment and environment to plan, prepare and consume the school meals. We must continually remember our original purpose--to feed children.

THE TEAM: HOW IT ALL WORKS

This chart shows the relationship of all possible 'players' on the team for a school food service project (and we haven't even shown local regulatory agencies)!



Please note that specific positions might vary from state to state but general duties remain the same.

Keep in mind that the architect should always be informed of all communication between consultants and food service personnel (shown on chart as dashed line).

Check with **your** state regulations regarding architectural services. For example, according to the State of Alabama Board for Registration of Architects, the services of a registered architect shall be required on all school buildings "and no official of this state or any city, town or county herein charged with the enforcement of laws, ordinances or regulations relating to the construction or alteration of buildings, shall accept or approve any plans or specifications that are not so prepared."

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APPLICABLE CODES AND REGULATIONS

Every project involving food service facilities in schools must meet the requirements of the following codes and regulations. Depending on the location of the project, local codes may apply also (as is the case with some local health departments); check city, county and state regulations for the exact codes that apply to your project. An example of some regulations that may apply are:

- State and Local Building Codes
- State Health Department Regulations
- Construction Requirements for County and City Public Schools (published by the State Department of Education)
- Americans with Disabilities Act (ADA)
- Local Health Department
- HAACP Code, USDA

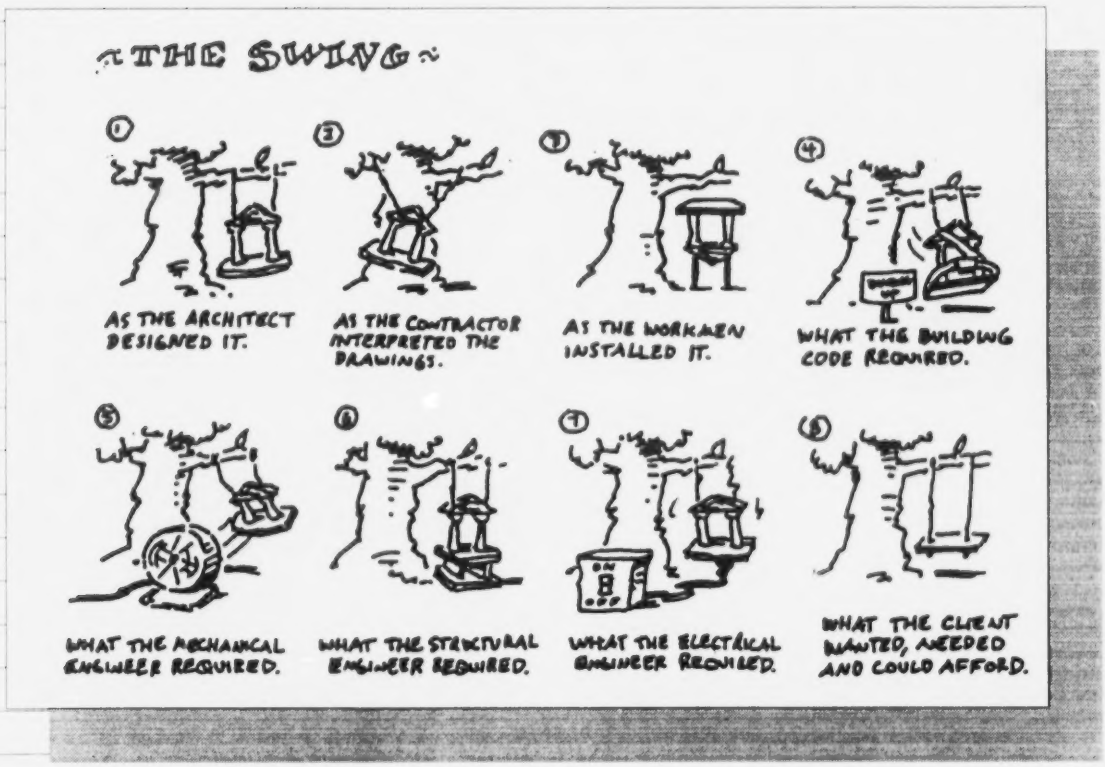
WHO APPROVES WHAT?

Most cities and counties have a building commissioner or building department that has specific requirements for alterations, additions and new construction. Usually, approval of the final plans and specifications by the state/city school architect, state/city building commission, and state/city health department is required prior to project architect advertising for bids.

In many places the following information will be needed for official approval of the project:

- Education Specifications (Planning Program) and Schematic Plans
- Preliminary Plans and Outline Specifications
- Final Plans and Specifications

Planning and communication are the keys to a well-designed food service facility. Both must be present in any successful project. The final result will ultimately depend on the effective planning and communication of the entire team. As everyone comes to the project with different backgrounds, interests, and levels of expertise, common ground must be achieved in the communication of ideas.



2-4

OBJECTIVES

Most of us are familiar with the cartoon above which has a little bit of fun at everyone's expense. But there is more than a little grain of truth in it when planning and communication breakdown within the team. In food service design there are lots of small, unfamiliar pieces that must go into constructing the whole. Things will go easier, with a good chance for success if, in the planning and execution of any school food service facility with several things kept in mind:

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THE IMPORTANCE OF THE PLANNING PROGRAM

School personnel call it 'creating educational specifications', architects call it 'programming.' No matter what the professional language, it describes the planning process necessary to make key decisions that **guide the school design and construction from the very beginning**.

These Alabama Construction Requirements For County and City Public Schools are useful in understanding the importance of a program (check your local and state requirements):

"A school plant should be designed to house a school program and of first importance is the determination of an education program based on projected curriculum and type of instructional areas to be provided, to clearly establish building requirements. It is the responsibility of the Owner to furnish the Architect this information in the form of a planning program, or educational specification, and to specifically establish budget requirements. If a building is to be planned in the most effective manner to adequately house the activities of a school and community educational program, the Architect must know in detail the program requirements."

This means that a logical planning process must be instituted, whether you are constructing a multi-million dollar new facility or doing a small kitchen renovation:

- **Begin by always including the people responsible for planning and building the facility and the people who are responsible for its day-to-day operation. For food service, it is crucial that the local food service director as well as school food service staff be included in preliminary planning sessions (they are responsible, after all, for the day-to-day success of the facility).** In cases where a new school does not have a staff assigned when preliminary planning takes place, it is extremely important that either staff be assigned or that the local food service director be involved in all decision making because of the huge diversity of child nutrition programs.
- Always look 10-20 years into the future when planning a facility. Kitchens are one of the most difficult and costliest spaces to renovate and add on to (as you already know if that is why you are reading this Handbook).
- Remember, questions are a good and usual part of the process when planning a building project.
- Complete the checklists found in chapter 3. The more information provided to the architect and/or food service consultant and engineers, the better they can serve the client in making sound design decisions. If you don't describe what you want in the building, the architect and consultants can't do their jobs effectively.
- Set realistic goals. At the very least, plan for the efficient use of construction funds to provide an efficient kitchen with a minimal amount of floor space to prepare and serve food. More space does not denote more efficiency!

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HOW TO MAKE COMMUNICATION EASIER

- Identify the team players. Review the team chart in this chapter, modify it for your project and then be sure to understand the role that each team member plays.
- Scheduling and deadlines are important in any construction project and even more so in food service facilities because of the coordination required between all the trades. In addition the **architect has a critical timetable for his/her work.** Supply information in a timely manner to keep the project on track.
- **Identify all reviewing agencies for the project right from the start.** This is often determined by the funding sources for the project. The type of building can also affect which agencies will have authority. All of the team members should have input into preparing the list of reviewing agencies. Research this information early and don't miss any agencies. This will avoid delays and other problems late in the process.

- **Anticipate lengthy agency reviews**. Some reviews can take up to a month or longer. It is helpful to establish contact with agencies, confirm their requirements for submittals, and make appointments to sit down with them to conduct 'workshop' reviews, if possible.

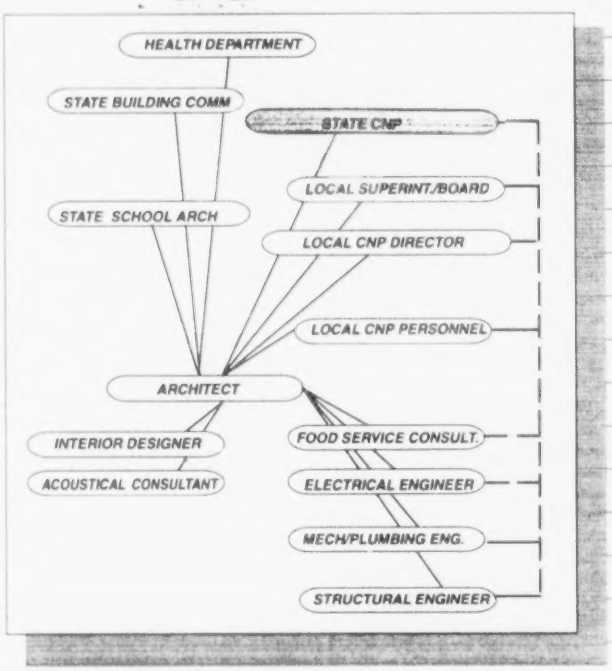
- Remember to check individual state requirements. Many states require approval of the final plans and specifications by the state school architect, state building commission, and state health department prior to the project architect advertising for bids. If your state has an official school or state architect, this would be the person to ask about final plan and specification approvals.
- And last but certainly not least, the advice of this Handbook and the state child nutrition programs should be taken into careful consideration to make school food service the best it can possibly be.

THE TEAM: STATE CHILD NUTRITION PROGRAMS

States may have a state department of education, child nutrition programs section, which can act in an advisory role for the local planning team.

The state child nutrition programs office may provide the following:

- Guidance to school districts in the implementation of child nutrition programs by helping school districts comply with federal and state mandates.
- Assistance with the efficient production of quality meals and the financial integrity of local programs.
- Review of architectural plans for renovation or construction to assure properly designed food service facilities to provide the child nutrition programs with:
- Potential and efficient use of staff and maximal production.
- Adequate space for appropriate storage and preparation of high-quality foods.
- The potential for efficient use of state, local, and private funding.



2-7

OBJECTIVES

Some states require that the food service sections of the following be submitted to the state child nutrition programs for review and approval:

Schematic Plans and Planning Program
Preliminary Plans and Outline Specifications
Final Plans and Specifications

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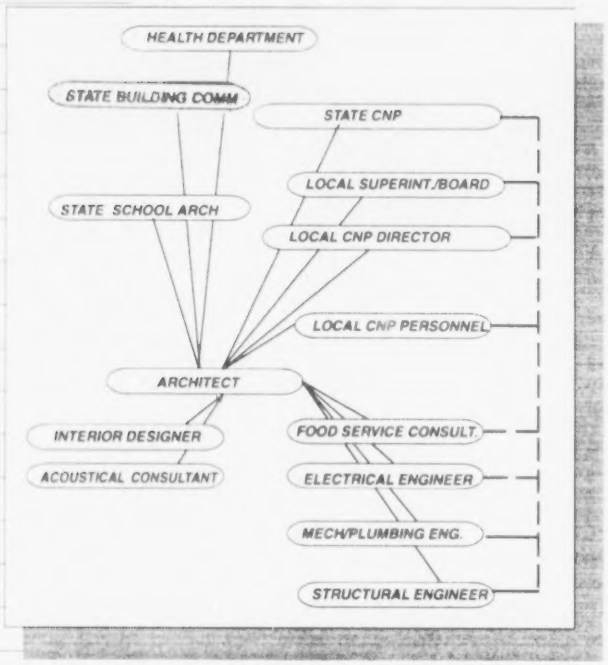
THE TEAM: STATE BUILDING COMMISSION

State building commissions may be responsible for publicizing laws, rules, and regulations to ensure that all facilities or portions thereof utilizing public funds are constructed according to the applicable building codes. All local school projects that involve alterations, additions, or new construction may require approval by the state building commission. These agencies are usually staffed with architects, engineers, and inspectors that review and monitor projects for the safety and soundness of public facilities.



The state building commission may do the following

- Reviews all plans and specifications for code compliance.
- Provides consultation services to local boards of education.
- Provides contract administration on state bond issue projects.
- Provides periodic inspections to ensure compliance with contract documents.

2-8

OBJECTIVES

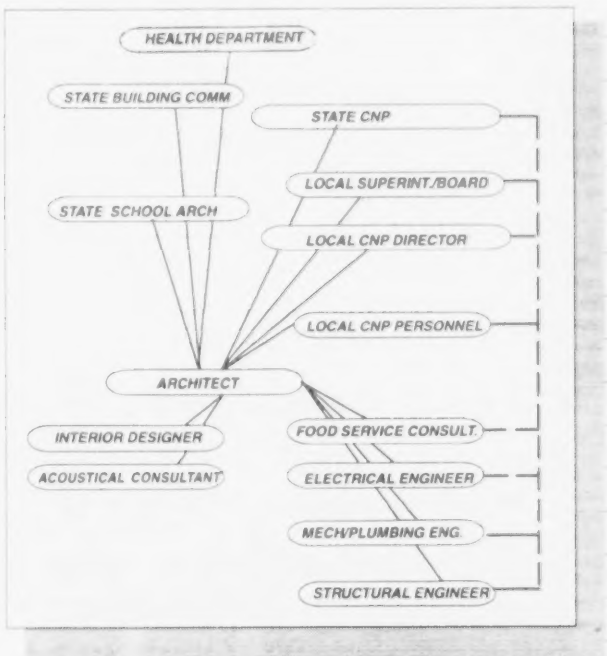
THE TEAM: STATE HEALTH DEPARTMENT

Many health departments are involved in the kitchen plan review process (and sewage disposal system if a public sewer is not used). For projects subject to approval by the state building commission, the state health department may conduct a joint plan review with a county health department. For all kitchen facilities, the county or city health department may review the kitchen floor plans and equipment specifications.

3-23

The general functions of a health department are:

- Review the floor plans and equipment specifications for the kitchen facility, in schematic, preliminary and final forms, for conformance with sanitation regulations.
- Make suggestions for revision if necessary.
- Issue approval of plans when sanitation requirements are met.
- Issue a Food Permit when construction is completed and meets the conditions of the final plan.



2-9

OBJECTIVES

*Many states have regulations requiring review of school food service plans by the state health department (**check your** state's requirements at the project start). For example, Alabama's Sanitation Rules Section 420-3-14-.42 states in part "No food service establishment shall be constructed, remodeled or converted except in accordance with plans and specifications approved by the Health Officer."*

In addition, the Construction Requirements For County and City Public Schools prepared by the Alabama State Department of Education Administrative and Financial Services Division states the following:

*"Approval of the final plans and specifications by the State School Architect, State Building Commission, and **State Health Department** is required prior to project architect advertising for bids."*

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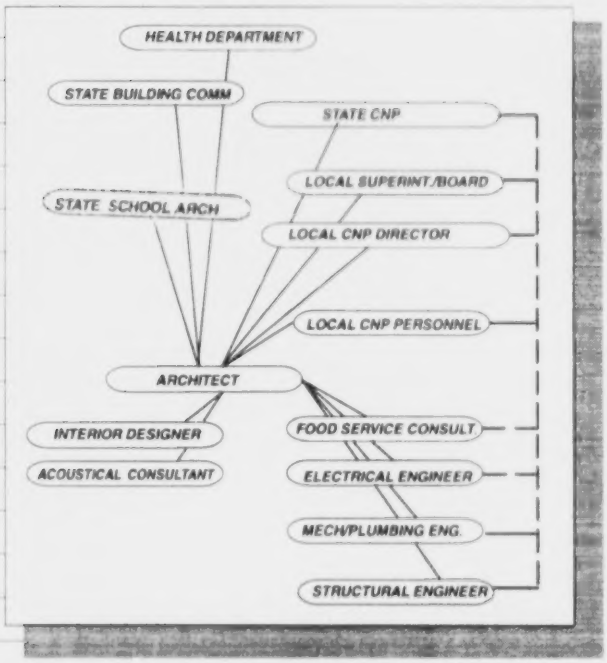
THE TEAM: STATE SCHOOL ARCHITECT

Some states may have a state school architect who acts as an agent for the State Superintendent of Education. His/her major responsibility is to assist local boards of education with the planning and construction of school facilities. Even though not directly involved in the design process, he/she can provide pertinent data relative to methods of construction, area considerations, and current costs that will guide the planning team. Through his/her monitoring of construction projects, the local board of education is assured of approvals by all applicable review agencies.



The State School Architect does the following:

- Reviews and approves architectural and engineering contracts for compliance with state board of education -adopted regulations.
- Reviews all plans and specifications as they pertain to the educational process.
- Reviews and approves construction contracts submitted by the local boards to assure compliance with state bid and contract laws.
- Inspects completed projects as required to verify that they are completed according to plans and specifications.

2-10

OBJECTIVES

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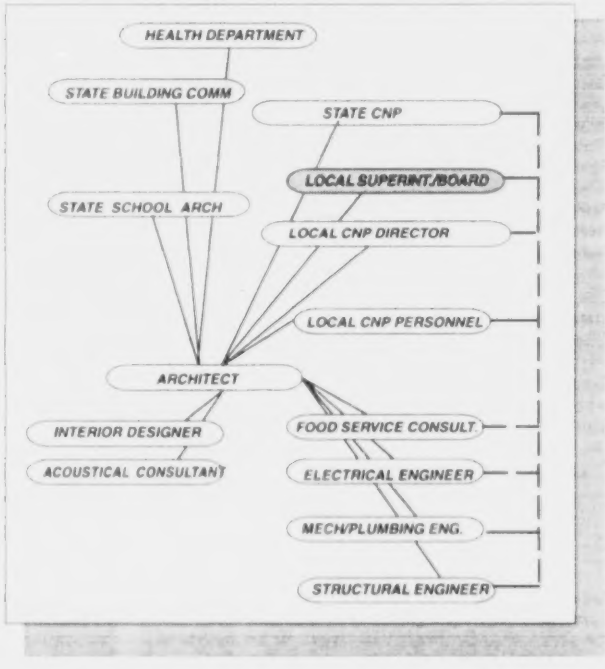
THE TEAM: LOCAL SUPERINTENDENT/ BOARD

The local superintendent/board act as the owner and is a key player in the planning team as all design and planning decisions must be approved by the owner. The local superintendent/board is usually responsible for seeing to the completion of the planning functions listed below. (Often the superintendent/board will rely on others to do the actual work involved, but must still approve and bear the responsibilities for these things.)

The local superintendent/board:

- Develop statements of basic goals and objectives for the project.
- Develop the basic operational concepts for food service. These will be broad policy decisions which will affect the building design, such as type of program and food service to be provided. These decisions are based on information gathered with the local child nutrition program director.
- Develop policies regarding standards of operation for the food service program with the involvement of students, patrons, teachers, administrators, school board members, etc. It is recommended that a foodservice consultant be relied on for advice.
- Select an architect.
- Work as a team with the local child nutrition program director and school food service personnel. The local superintendent/board should approve: Preliminary Building Plans and Space Allocation, Food Service Equipment Specifications, Final Building plans and specifications.
- Provide equipment to enable facilities to function properly.



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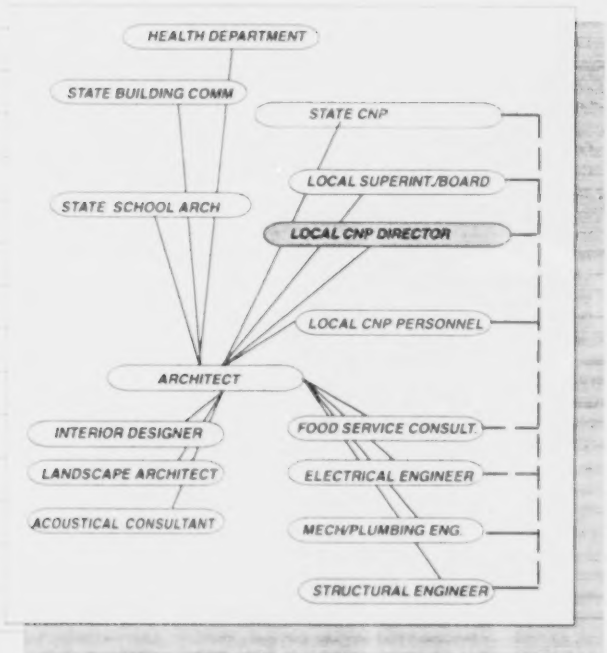
THE TEAM: LOCAL CNP DIRECTOR

The local Child Nutrition Program (CNP) Director is a key individual in planning a new or renovated food service facility.



2-12

OBJECTIVES

The CNP Director provides input for the following functions:

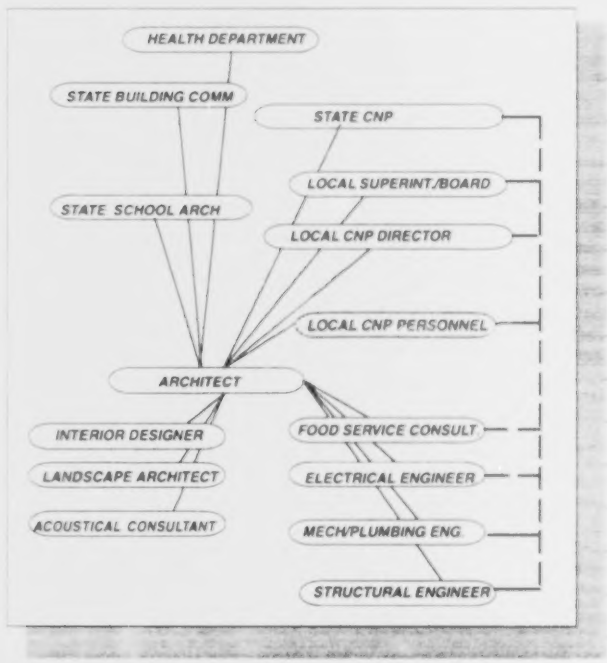
- Works with the local planning committee during the early stages of planning.
- Determines the basic goals and objectives of the new or renovated food service facility.
- Determines the basic operational concepts and philosophy of the food service facility, including menu system, fit of food service to students' age/grade and ethnic diversity, and the food service role in the overall eduational program.
- Provides input in the selection of a consultant for the food service facility.
- Reviews and recommends approval of the final architectural drawings.
- Provides information and details on equipment specifications.
- Monitors progress during construction to ensure that needs are met.
- Recommends final approval when specifications are met and items completed.

THE TEAM: LOCAL CNP PERSONNEL

The local Child Nutrition Program personnel provide information and suggestions for the food service operation. They serve as advisors to the director and members of the planning team.

The local Child Nutrition Program personnel are responsible for providing input in the following areas:

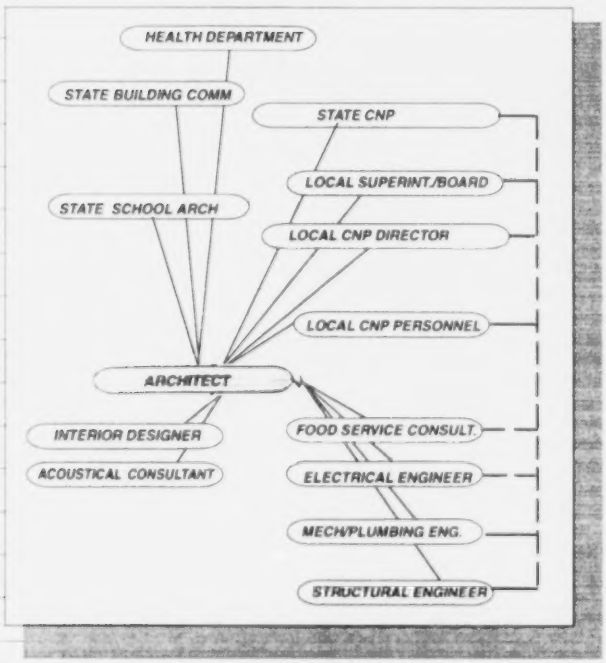
- Sanitation and safety, including knowledge of OSHA and HACCP regulations
- Work environment
- Simplification of work areas
- Increasing productivity



THE TEAM: ARCHITECT

The architect plays a pivotal role on the food service team. The planning of a food facility, whether it be new construction, renovation, or an addition, puts the architect in the role of director who has to offer planning, technical guidance, advice, and counsel. An architect is someone who has fulfilled the qualifications fixed by state law.

The architect may use the services of professional engineers or other experts but he/she is still in control of all parts of the building process.



Services of the architect:

- Participates as a team member in the planning phase for food service design.
- Visits the site, examines laws, codes, rules, and regulations of governing agencies.
- Prepares schematic design studies based on the educational and food service specifications (building program) developed by the team.
- Coordinates work and information with food service consultants, engineers, interior designers and others working as consultants on the project.
- Prepares detailed working drawings and specifications from which contractors will submit bids to the owner and from which the facility will be built.
- Submits preliminary and final plans and specifications to the necessary authorities as required by law.
- Provides on-site inspection during and after completion of the food service equipment installation and checks contractor payment requests for the owner.
- Verifies that all warranties and guarantees on food service equipment have been submitted.

2-14

OBJECTIVES

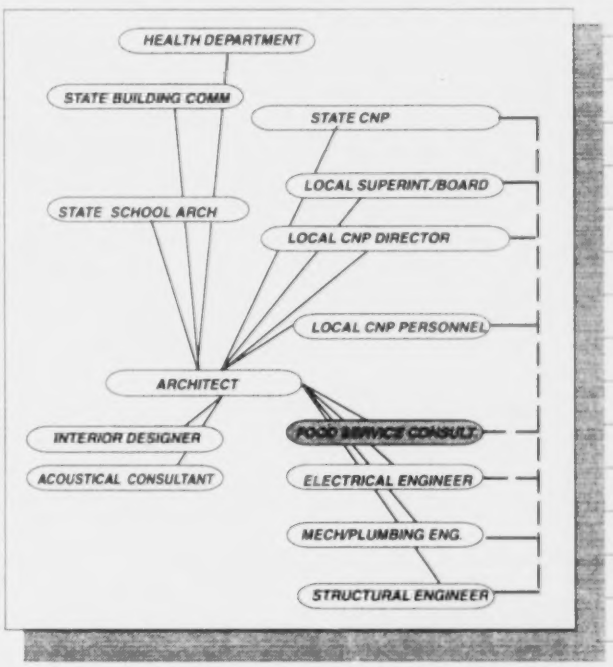
- *Architects can't control market factors which affect bid prices.*
- *Remember, architects recommend, clients decide.*

THE TEAM: FOOD SERVICE CONSULTANT

The food service consultant works closely with the architect and local CNP director to develop a functional and efficient design of the food service areas. He/she is knowledgeable of all the up-to-date equipment and new developments in the food service industry. He/she has no affiliation with any manufacturers or suppliers that would cause a conflict-of-interest in the designing and specifying of equipment.

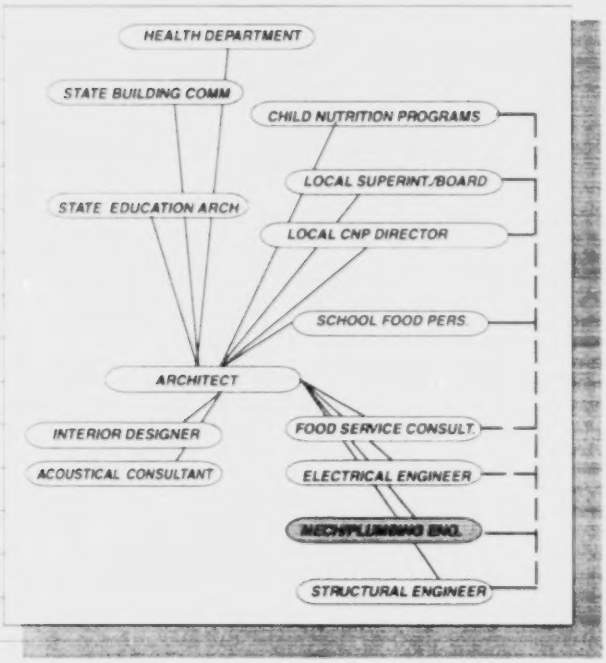
Services of the food service consultant:

- Visits the site, examines laws, codes, and regulations of governing agencies that apply to the preparation and serving of food.
- Prepares schematic design studies, construction documents, and cost estimates required to convey the scope of the food service equipment to the team members and bidders.
- Prepares an equipment layout and schedule and other details required. This includes an engineering data manual with technical data for all of the food service equipment items.
- Assists the architect and owner in reviewing acceptable food service equipment contractors and bids and reviews all submittals of the food service equipment contractor to verify that they comply with the food service equipment contract documents.
- Provides on-site inspection during and after completion of the food service equipment installation.
- Prepares a punch list of any deviations from the contract documents and makes recommendations for final approval of the installation.
- Observes and approves the satisfactory demonstration of the equipment and verifies that all warranties and guarantees have been submitted.



THE TEAM: MECHANICAL / PLUMBING ENGINEER

The mechanical/plumbing engineer works as part of the design team. His/her role on the team serves two functions. In the early phases of the project, the mechanical/plumbing engineer is an advisor, highlighting or explaining the mechanical/plumbing design economics and code related issues and how they affect the systems. The second part is to execute the design, incorporating the food service consultants equipment into the building.



2-16

OBJECTIVES

The mechanical/plumbing engineer is responsible for:

- Designing HVAC Systems required or desired for the kitchen and associated areas.
- Coordinating information on kitchen equipment, especially the hood, in determining types of HVAC systems to be used and sizes required.
- Designing plumbing systems for food service areas.
- Coordinating waste and water requirements of kitchen/food service for these requirements.
- Advising members of the design team during the preliminary phase of planning.
- Coordinating with the other design disciplines.
- Submitting preliminary and final plans and specifications to the architect.
- Providing construction administration services that include site observation, answering contractor questions, checking pay requests, and shop drawings.

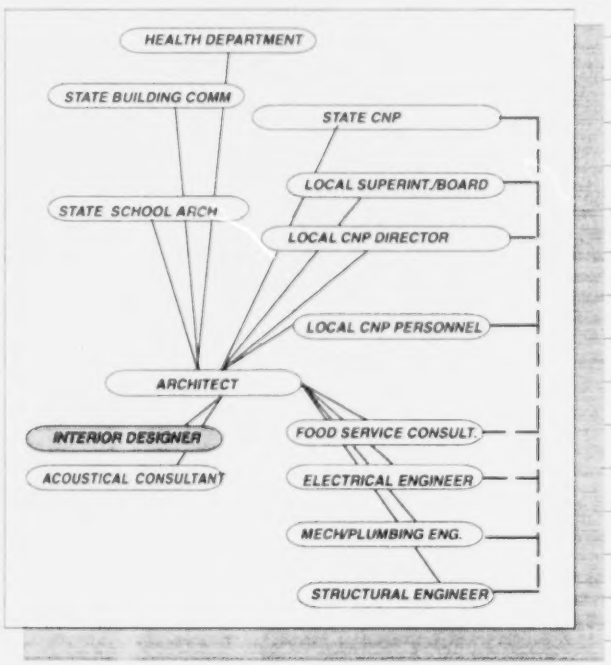
THE TEAM: INTERIOR DESIGNER

Not every project has an interior designer and very often the architect provides these services.

Concern over such things as atmosphere, furniture, colors, and textures is a smart thing as any successful (or unsuccessful) food service person will tell you. School food service should be treated with the same degree of care as restaurant designs when it comes right down to it.

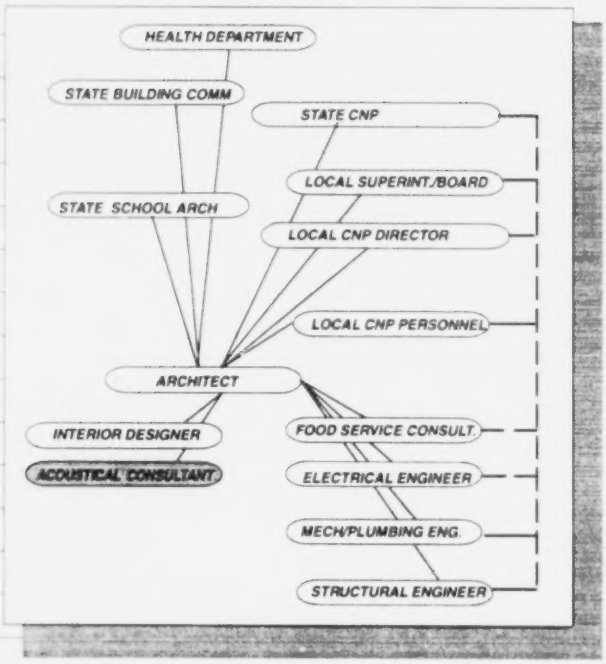
Interior designers may be responsible for:

- Developing floor plans and seating plans in dining areas.
- Developing color schemes and selecting finishes.
- Providing furniture layouts and furnishing material/finish specifications.
- Working with architect and electrical engineer to design the lighting.



THE TEAM: ACOUSTICAL CONSULTANT

An acoustical engineer or consultant has specialized know-how in the way sound travels, is amplified, and is controlled. As a team member, the acoustical consultant works closely with the architect and other consultants in determining how room sizes and proportions, along with finishes affect noise.



Acoustical consultants may be responsible for:

- Determining the acoustical quality of spaces.
- Providing recommendations on how to achieve the devised acoustical qualities.
- Recommending finishes and placement to minimize noise levels.
- Designing A/V systems and installation criteria for multipurpose rooms such as cafetoriums which serve as both cafeterias and auditoriums.

2-20

OBJECTIVES

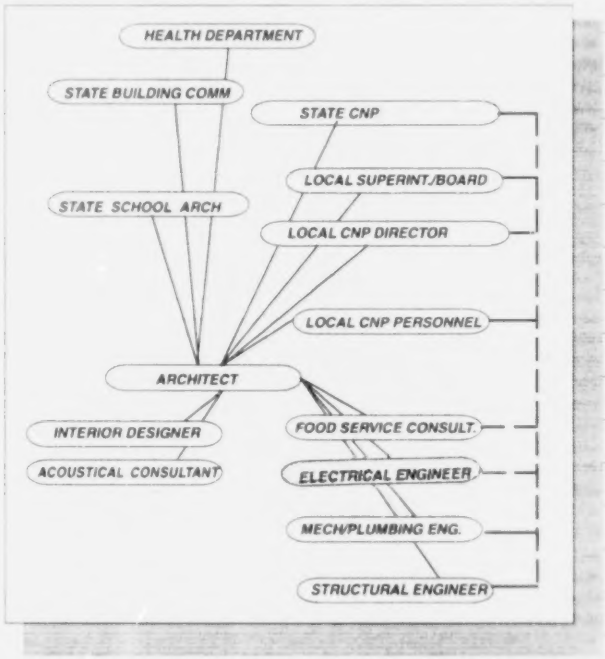
THE TEAM: ELECTRICAL ENGINEER

The electrical engineer provides electrical engineering services for the team. This is usually done as a service to the team architect. The electrical engineer is someone who is certified to practice engineering by state law.

The electrical engineer is responsible for the electrical portions of the work including lighting, power distribution, fire alarm systems, etc.

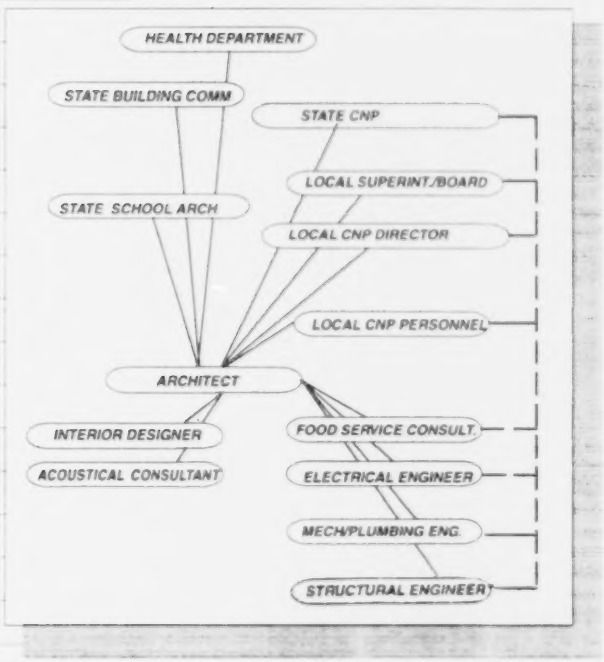
Services of the electrical engineer:

- Visits the site prior to design such as in renovation and addition work.
- Examines codes, rules, and regulations of governing agencies.
- Coordinates electrical requirements of food service equipment, mechanical equipment, etc., as needed.
- Prepares detailed working drawings and specifications for the electrical portion of the work.
- Provides construction administration services that include site observations, answering contractor questions, and checking shop drawings.



THE TEAM: STRUCTURAL ENGINEER

The structure of a building (foundations, columns, beams, slabs, joists, decking, etc.) is designed by the structural engineer. The structure must be capable of supporting its own weight and what are known as live loads (based upon the occupancy and use of the space - a classroom is not designed for the same live loads as a storage room) and lateral loads (wind, earthquake[seismic] and thermal loading). In addition, the mechanical, plumbing, and architectural conditions may require the support of special concentrated loads which are not evident from the weight of the building or code requirements. These must be communicated to the structural engineer by the team members.



Services of the structural engineer:

- Evaluates the structural systems that fit the building or spaces' functional requirements. These requirements are normally set by the owner but conveyed to the structural engineer from the architect. [You don't put a column in the middle of a basketball court.]
- Evaluates the structure of existing buildings to assess the need for additional structural work to accommodate renovations and additions.
- Assists the architect in the selection of the overall structural system for the building. This requires the coordination of all the team members associated with the building design.
- Provides loading and other information to assist the owner's geotechnical engineer with his assessment and investigation for the foundation design requirements.
- Provides the structural design and develops the structural contract documents, including drawings and specifications.

2-18

OBJECTIVES

The structural engineer relies upon the accuracy and completeness of information furnished by the architect and other consultants such as:

- Building dimensions.
- Occupancy classification.
- Geotechnical report and recommendations.
- Equipment loads.

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THE RIGHT DECISIONS BY THE RIGHT PEOPLE

Regardless of whether you are planning for new construction, a modest addition or a renovation, information about the existing facility or planned construction must be gathered and some basic decisions must be made at the very start. This will save time and money down the road.

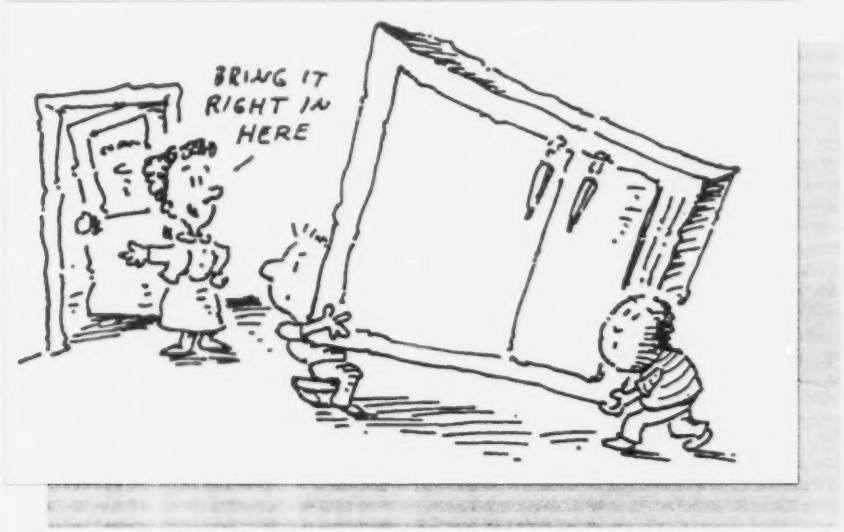
Everything that is done should aim to:

- *Provide a well-designed, efficient cafeteria making the maximum use of the funds available to serve students high quality food.*
- *Acquire the best equipment available to do the job needed.*
- *Provide a pleasant working environment for employees.*
- *Provide an atmosphere conducive to good eating habits for the students.*

It is critical that the people making the decisions about food service are the people who will have to work in the school kitchen. In new construction, in order for all the team members to work most effectively, it is important that the architect, engineer and food service consultant, if one is used, be given as much information as possible at the very beginning of the project. The right people in the decision making process will make it more likely that the above goals will be achieved.

BASIC DECISIONS

The check lists in this chapter and the information on basic decisions that must be made at the start of the project should be reviewed carefully and used! There's a reason this Handbook is in looseleaf format. Take these checklists out, copy them and use the copies to record your decisions and basic facility information. This is as important in small renovations as it is in new school construction. Knowing basic information about your existing food service facility can avoid pitfalls that can create headaches for all involved.



DEFINING THE SCOPE OF THE PROJECT

This is the first and most important part of getting started. The project will fall into one of the following categories:

- All new construction.
- Major addition or renovation to an existing facility. This would require total "shut-down" of the facility in order to accomplish the work.
- Minor addition or renovation to an existing facility. This work can be performed with little or no interruption of the existing operation.
- New equipment only. No building construction required. Beware of this category!! As a rule there is not a member of the design team involved and the wrong equipment selection can lead to very costly results; it is important to avoid purchases of unneeded equipment.

"GETTING STARTED" FACILITY DATA SHEET

It is recommended that separate Facility Data Sheets be prepared by the state child nutrition program office (if applicable) and the local school district. The Facility Data Sheet documents information that influences total space, equipment and miscellaneous requirements. Upon completion the sheet should be used to make specific recommendations to the architect and/or kitchen consultant as to type of service, equipment list, general facilities, etc. A copy of this Facility Data Sheet is located in the Appendix.

General Project Information	**Date:**
Project name	
Address	
School district	
Contact	
Address	
Phone	
Fax	E-Mail
School Food Service Director	
Address	
Phone	
Fax	E-Mail
Architect	
Contact	
Address	
Phone	
Fax	E-Mail
Mechanical Engineer	
Contact	
Address	
Phone	
Fax	E-Mail

"GETTING STARTED" FACILITY DATA SHEET

Electrical Engineer	
Contact	
Address	
Phone	
Fax	E-Mail
Structural Engineer	
Contact	
Address	
Phone	
Fax	E-Mail
Food Service Consultant	
Contact	
Address	
Phone	
Fax	E-Mail
Project Dates	
Design Completion:	Bidding:
Construction Beginning:	Completion:
Restrictions	
Food Service Facility Budget:	Other:
School and Student Information	

Student ages _____ Grade levels _____

School capacity _____ Future school capacity _____

Estimated number of daily customers

	Breakfast	Lunch	Other
Students			
Staff			
Others			
Totals			

"GETTING STARTED" FACILITY DATA SHEET

Number of lunch periods_____ Length of each session _____

Block class scheduling? ☐ Yes ☐ No

Open campus? ☐ Yes ☐ No

Student canteen? ☐ Yes ☐ No

Is service continuous? _____

Hours of service: ☐ Breakfast _____

☐ Lunch _____

☐ Other _____

Maximum seated at one time _____

Type of Food Service System

☐ On-site preparation and serving

☐ On-site preparation for on-site serving and satellite locations

Number of satellite locations _____

Meals served at each location _____

(be specific with above: describe each location in detail)

☐ Satellite - receiving/serving

☐ Bulk hot

☐ Bulk refrigerated for heating and serving

☐ Pre-plated

☐ Ready-to-serve

☐ Refrigerated for reheating and serving

3-11

3-12

Types of Food Service

☐ Traditional ☐ Self-serve ☐ Scramble

☐ Other _____

3-13

Menu

☐ Choice ☐ Limited choice

Self-service bars (check all that apply):

☐ Salad ☐ Taco ☐ Pasta ☐ Dessert ☐ Potato

☐ Other (list) _____

"GETTING STARTED" FACILITY DATA SHEET

Serving method (check all that apply):

- ☐ Straight serving line for cafeteria-style service
- ☐ Scramble style
- ☐ Vending machines in food service area
- ☐ Window-style service
- ☐ Self-service speed line

Dining/eating area (check all that apply):

☐ Inside building ☐ Outside building ☐ Both

Seating capacity:

Commons area _____ Dining room _____

Multipurpose room _____ Faculty/staff dining room _____

Total _____

Preparation

Indicate products to be used and method of preparation:

Food	Basic (raw) ingredients	Mixes	Ready-to-serve
Bread (sliced, french)			
Rolls			
Muffins, biscuits, etc.			
Pastry items			

Method of cooking (check as many as are applicable):

Food	Fry	Steamer Bake (oven)	Top of Range
Vegetables			
Potato Products			
Chicken/Poultry			
Hamburgers			
Pizza			

Will batch cooking be done? _____

"GETTING STARTED" FACILITY DATA SHEET

Fuel Selection and Utility Information

☐ Electricity

Special voltage requirements _____

☐ Gas: natural?_____ LP? _____

☐ Steam

Receiving/Waste Disposal

What size trash receptacles? _____ How many? _____

Prefered location for can wash and storage _____

Waste disposal systems to be used:

☐ Garbage disposal ☐ Compactor ☐ Pulper ☐ Cans/dumpster

Frequency of trash pick-up _____

Is trash storage space needed? _____

Recycling provisions _____

Employee Facilities

Employee toilets and lockers:

☐ Handwashing facilities/lavatories

☐ Men's and women's facilities: ☐ # of lockers each _____

☐ Unisex facility: ☐ Number of lockers _____

Number of offices required _____ Persons per office _____

Office furniture and equipment requirements:

_____

_____

_____

_____

Will a clothes washer and dryer be required? _____

Will a time clock be required? _____ Location _____

Storage

Refrigeration requirements:

Percentage of frozen food _____

Percentage of refrigerated food _____

3-19

"GETTING STARTED" FACILITY DATA SHEET

Special requirements:

Type of refrigeration equipment:

Refrigerator:

Reach-in _____ Walk-in _____

Reach-through _____ Roll-through _____

Freezer:

Reach-in _____ Walk-in _____

Ice cream cabinet _____ Milk shake machine _____

Ice machine _____

Dry storage requirements:

Check all disposables to be put in dry storage area:

☐ Straws ☐ Napkins ☐ Hot cups ☐ Cold cups

☐ Bowls ☐ Plates ☐ Trays ☐ Pan liners

☐ Sandwich wrap/bags ☐ Aluminum foil pans

☐ Other _____

Serving

Will cashier computer terminals be used? _____

Computers linked to a mainframe? _____

Location of mainframe? _____

Methods of payment: ☐ Cash ☐ Tickets ☐ Computer cards

Will special merchandizing be required in serving area?

☐ Menu boards ☐ Signage ☐ _____

Type of condiments provided: _____

Location of condiments: ☐ Serving counters ☐ Condiment counters

☐ Serving area ☐ Dining room ☐ Other _____

How will condiments be dispensed?

☐ Pumps ☐ Portion packs ☐ Other _____

"GETTING STARTED" FACILITY DATA SHEET

Beverages to be offered and how dispensed:

_____

_____

_____

Extra purchase items to be offered and how dispensed:

_____

_____

_____

Type of serving pieces:

☐ Permanent ware ☐ Disposable ☐ Combination

Dish/Tray Washing

Will students self-scrap trays/dishes/flatware?

☐ Full self-scrapping ☐ Partial self-scrapping

Sanitizing System:

Trays/Dishes/Flatware: ☐ Chemicals ☐ 180+ hot water

Pots/Pans: ☐ Chemicals ☐ 180+ hot water

Use of Facility by Others

Will facility be used by outside groups? _____

Frequency of use by outside groups? _____

Times of use? _____ Typical size of group? _____

How will groups gain entrance to facility? _____

☐ Food preparation ☐ Just dining area use

Type of food preparation _____

Who (if anyone) will supervise outside groups? _____

What should access be limited to? _____

If adults will be using facility, what type of seating will accommodate them best? _____

If the facility will be used by others, will restrooms be provided immediately adjacent to the dining room? _____

Other Considerations

Will any existing equipment be used?

If so, your local department of health may require a complete written inventory which may include:

- present location of item
- name of manufacturer
- model number
- all dimensions of item (length, width, height)
- utility requirements for connection
- will school install or contractor install?
- any special requirements not listed above

Special requests for preparation or serving equipment (list items)

Special requests for overall design

Special requests for teachers and staff (list items)

Should facility be designed for future capacity?

Description of activities associated with spaces: will dining be used as a multi-purpose room? Will there be a stage?

Description of innovations or experimental ideas which might be incorporated into the program.

Method of procurement of equipment

Desired finishes for equipment and spaces

Equipment needed for each function

What are the market demographics?

- What is the competition inside and outside of the school? This includes everything from students brown bagging it to the McDonalds around the corner.
- Consider the ethnic mix and age of students and other users of the facility when planning food service and meal types.

TRADITIONAL SYSTEM

This is also referred to as a conventional system or self-contained kitchen. Basically, food is prepared and served at the same place. According to NFSMI research, approximately 70% of schools in the United States use this type of system. Below are some reasons why this might be the case (along with some items on the down side):

- Schools may be independent in their food service
- Each school may have more flexibility in what it can do
- Changes in menus can be made more easily
- Food is fresher because it is prepared on site
- Kitchen may be available for other groups and/or functions after school hours

- Services are duplicated at each school
- Space and equipment are duplicated at each school

SATELLITE SYSTEM

What is a satellite system? In general, food is prepared at one location (central kitchen) and then transported (cold, frozen or hot) to another location (satellite) for serving. This can be accomplished by one of two methods:

- **Bulk Food Method:** The food from the central kitchen is transported in bulk food containers to be portioned and plated at the satellite school.
- **Pre-plated Method:** The food from the central kitchen is portioned and pre-plated before transporting to the satellite school.

Many variables and variations must be considered in a satellite system. Food quality and sanitation are key concerns. To cover all aspects would take pages and pages of this Handbook. To make a satellite system work and become profitable, good central management is of the utmost importance. If you are considering a satellite system do your research well!

- Purchasing is centralized which usually means better prices
- Only one kitchen is required for many delivery sites
- Greater productivity of employees at the central kitchen since food will usually be prepared "assembly line" style
- Easier to achieve standardized quality and quality control
- Portion control is more consistent

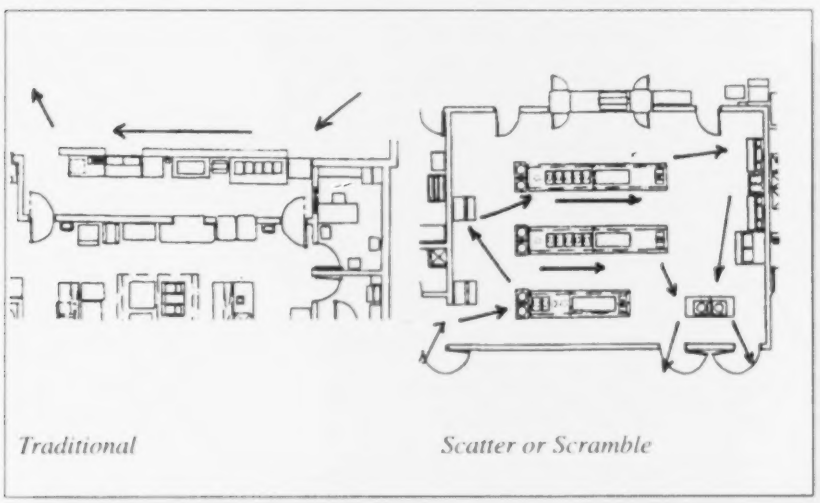
- Transportation costs can be very high
- Menu planning is difficult and usually has less variety
- Special transport delivery equipment will be required since food must be held at a safe temperature for a long period of time
- Food may lose nutritional value
- Food quality usually suffers due to "holding time"
- Food waste is higher
- Central kitchens must be larger and therefore more expensive
- More employees are required at the central kitchen
- Any problems occurring at the central kitchen (such as unexpected gas or power disruptions or breakdown of delivery vehicles) will mean problems for all of the satellite schools

TYPES OF FOOD SERVICE AND SCHEDULING

Students must be offered a complete meal with specific nutritional requirements if Federal monies are earned. However, today's students are offered a variety of food items and choices in a variety of service options. As in any food service operation, the central focus is on the customer, and his or her preferences drive the menu and service system within the restraints of school scheduling. It must be noted however, that no matter what the type of food service, it is important that you follow state and USDA requirements regarding checkpoint design. Failure to meet requirements could jeopardize USDA and/or state reimbursement for meals served.

A: Traditional: Students "queue-up" in an organized manner and are served by school food service employees.

B: Scatter or Scramble: This term applies to a serving area arrangement where students are allowed to freely move from counter to counter to make food selections. This system will require more space than a traditional system. Without sufficient space for the students and school food service employees to move freely between counters this system will not work!!



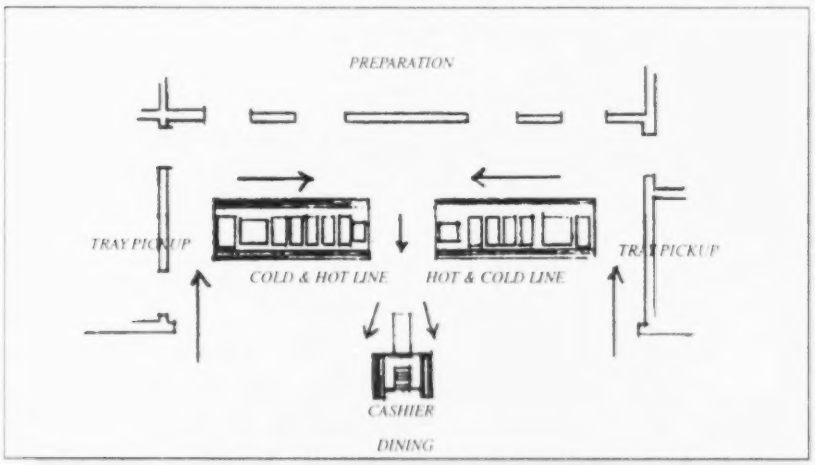
Traditional *Scatter or Scramble*

C: Self-serve: Students select and serve themselves. Food is replenished as needed by a school food service employee.

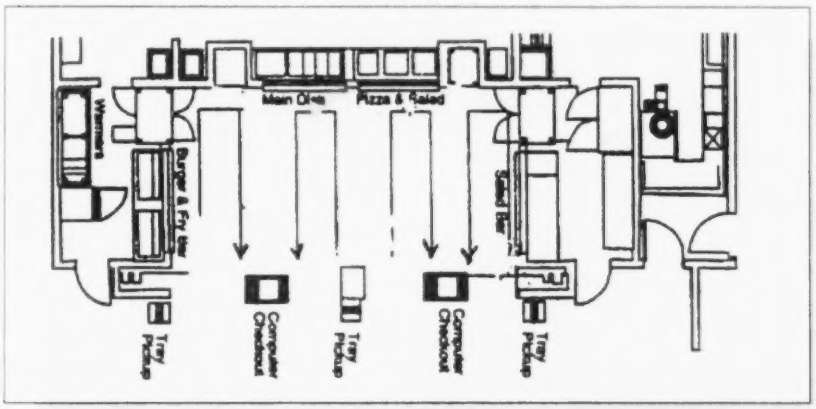
- **Specialty Bar:** A self-serve counter designated for a particular food item. These counters may be heated or refrigerated or a combination of both depending on the food offered. Some popular examples are bars featuring salad, taco salad, sandwiches, baked potatoes with toppings, fruits and cheese, cereals with fruit toppings, desserts with toppings, etc.

  When designing specialty bars try to make the arrangement and equipment as flexible as possible to allow for a change of menu or item unavailability.

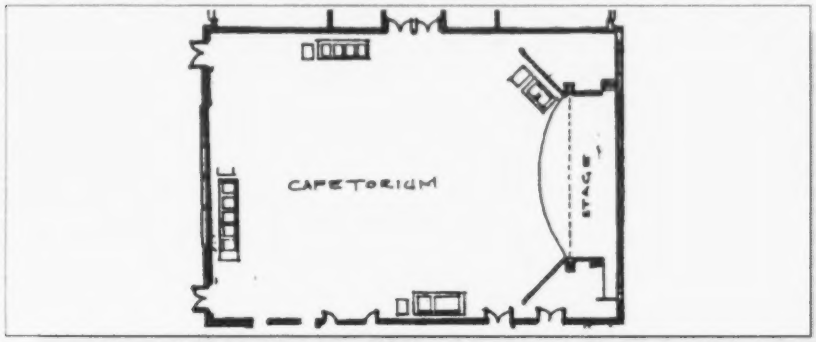
- **Salad Bar:** A refrigerated self-serve counter that will offer such items as meats or meat substitutes, vegetables, fruits and breads.



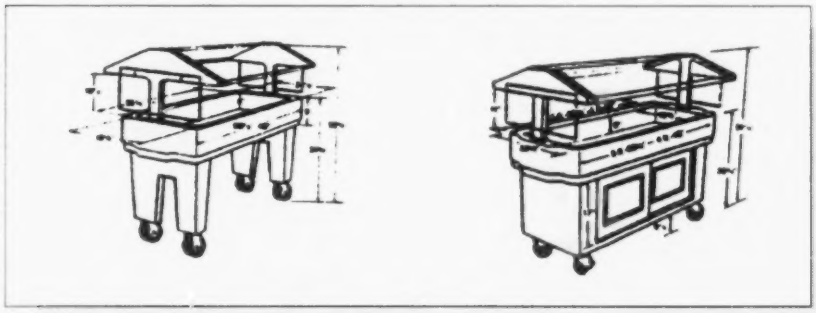
D: Food Court: Students select from various specialty stations such as burger & fry bar, salad bar, main dish bar, and pizza bar. Food is served by school food service employees.



E: Kiosks and/or Multiple Decentralized Areas: A variety of meal offerings are available for students to select from multiple kiosks located around the dining area. Food is served and replenished as needed by a school food service employee. A cashier is at each station or mobile unit.



F: Mobile Units/Carts: Various menu options are offered from mobile units taken to different locations on the school campus.



SERVING RATES IN STUDENTS PER MINUTE

Type of Service	Students per Minute
Serving Window:	
where orders are filled	3 per minute
where filled trays are picked up	14 - 20 per minute
Traditional (straight line)	7 - 12 per minute
Speed line*	20 - 28 per minute
Scramble	20 per minute
Self Serve	10 per minute

* Service is available on both sides in a speed line. Two cashiers will be needed to maintain a speed of 28 students per minute.

Source: Adapted from School Nutrition Facility Planning Guide, California Department of Education, Sacramento, Ca 1992.

RECYCLING

Recycling is the act of extracting materials from the waste stream and reusing them. Recycling generally includes collection, separation, processing, marketing and the creation of a new product or material from the used products or materials.

To recycle or not to recycle, that is the question (for the time being).

We say this is a question or decision you must address for the time being because it does seem as though we will all be required to make every effort to recycle as much as possible by the year 2000. And while this is still a new idea for many schools, food service is the ideal target to begin a recycling program because the amount of daily waste and the type of waste is very consistent from day-to-day and week-to-week.

So, how do you get started if you have no recycling program now?

First, remember that there are three simple parts to any recycling program:

- Separation of materials
- Placement of containers
- Pick-up of materials

RECYCLING

Decide **what materials will be separated and recycled** and **who will pick them up**. To make this decision, you can:

- Contact local government officials about any recycling effort that is part of the community now and call the company responsible for carting waste from school dumpsters at the school and ask about how they participate or pick up goods as part of a recycling effort.

  Generally, in rural areas, a private waste management company, county agency, or recycling company can be used to pick-up materials. In more urban areas, city agencies might take the place of county agencies for material pick-up.

Allocate **areas for placement of containers**. Some general guidelines to follow:

- Containers holding trash to be recycled should be convenient to the loading dock/trash collection area.
- Containers should be placed in dish/tray return areas to allow students to separate materials (this will not require any additional staff on the school's part).
- Containers should be placed in the kitchen to allow workers to separate materials during preparation.
- Designate an area for crushing cans and boxes.
- Containers must be carefully maintained and kept closed when not in use to prevent attracting pests.

And so you say, "well, this is an awful lot of trouble, we really can't do this right now because"	*And we might reply that "it's to your advantage to start a recycling program now because"*
• we don't have the space to dedicate to collecting and storing things to be recycled.	• you need trash cans anyway and most items can be stored outside. You will need plenty of outdoor space for storage of items to be recycled - especially cardboard boxes.
• we don't have the know-how to start the program.	• most carting companies and government agencies have guidelines to follow which is all you'll need.
• we certainly don't have the money to hire someone to run the program.	• it shouldn't take any additional staff if you let students sort their trash as they dump it.

And so you say, "well, this is an awful lot of trouble, we really can't do this right now because"

- who has the time to figure out how it all works?
- how will our school really make any difference in the big picture of things?
- what else is in it for us?

And we might reply that "it's to your advantage to start a recycling program now because"

- every little bit does indeed help!
- your school might also provide drop points for the public which will increase the community's awareness of what goes on at your school. This may be helpful when you need funds to make that expansion, send the band on that traveling tour or gather other kinds of community support.
- school recycling programs can be used to build awareness of recycling in the public and it's nice to know that schools can educate adults also.
- products purchased of recycled materials may be cheaper and save the food service program and the school money.
- of course, you are doing something good for your environment and the future environment of the children now in school.
- it's always easier to start a program tailored to your needs before it becomes mandatory with lots of regulations from your local and state authorities. And who knows, your program may be the model program used to set guidelines for a mandatory recycling effort!

COOKING FUELS AND POWER SOURCES

The choice of a cooking fuel will be based on economics (rates), personal preference of the user, or existing conditions in the school.

Utility companies offer evaluations of fuel usage and costs. These evaluations are helpful and can provide useful information to the design team and client in planning. The evaluations usually are somewhat biased toward the utility performing the analysis but the information is still beneficial to the engineer and the user.

THE CHOICES

- **Natural gas,** when available, burns cleanly, and is economical. If the gas is available on site, an economic analysis will probably prove this fuel to be the best option. Gas will add heat to the kitchen but it is quicker to reach desired temperatures. It is important that the gas supply be adequate for the peak demand.
- **Bottled or propane gas** is an alternative to natural gas or electric. Appliances must be modified to burn propane gas. Low pressure gas is satisfactory for kitchen equipment (7-9 oz/sq in).
- **Electric** appliances operate very cleanly. Electric cooking is efficient, clean and can be controlled very accurately. Cost of operation is usually greater than natural gas but some electric utility companies have a rate that is very attractive if electric power is used exclusively.

HOW TO CHOOSE

If a kitchen is going to be all electrical, the first cost of the electrical system will increase by approximately 10%. The increased cost of the electrical systems is due to a larger service being required to handle the load. The plumbing system cost will decrease but not by enough to cover the increased cost of electrical.

However, in some cases, the payback by having a lower electrical utility rate may make sense. To determine this, a cost study would need to be done using utility charges for your specific area. Many utility companies offer this service free of charge although it is highly recommended that a mechanical/electrical engineer be hired to provide an independent study for comparison.

If this is a renovation, the electrical service for the food service may not have been designed to handle that much additional load. The electrical service should be verified for capacity prior to ordering new equipment.

WHO BUYS AND INSTALLS THE EQUIPMENT?

The decision of who will buy and who will install the food service equipment can be a complex issue. Let's take a closer look at some of the factors involved:

In most cases, there are three choices:

- Contractor buys and installs
- School district buys / Contractor installs
- School district buys and installs

Let's look at the pros and cons of each:

CONTRACTOR BUYS AND INSTALLS

- Contractor can coordinate the delivery and installation of the equipment
- Contractor can coordinate all utilities
- Contractor responsible for the installation of equipment in compliance with applicable codes
- Contractor responsible for coordination of trades
- Contractor responsible for damaged equipment or equipment that does not work properly (warranty claims go through one person)

- School district must pay contractor's mark-up on equipment
- School district will not have full influence on equipment vendor selection

SCHOOL DISTRICT BUYS / CONTRACTOR INSTALLS

- School district saves percentage of profit and overhead paid to contractor if contractor had supplied equipment
- Early purchase of equipment may help project schedules
- Better control over equipment vendors

- School district must supply purchasing function (expediting, shipping and receiving)
- School district is responsible for coordination of electrical, plumbing, water, and gas connection work
- School district is responsible for coordinating delivery and installation

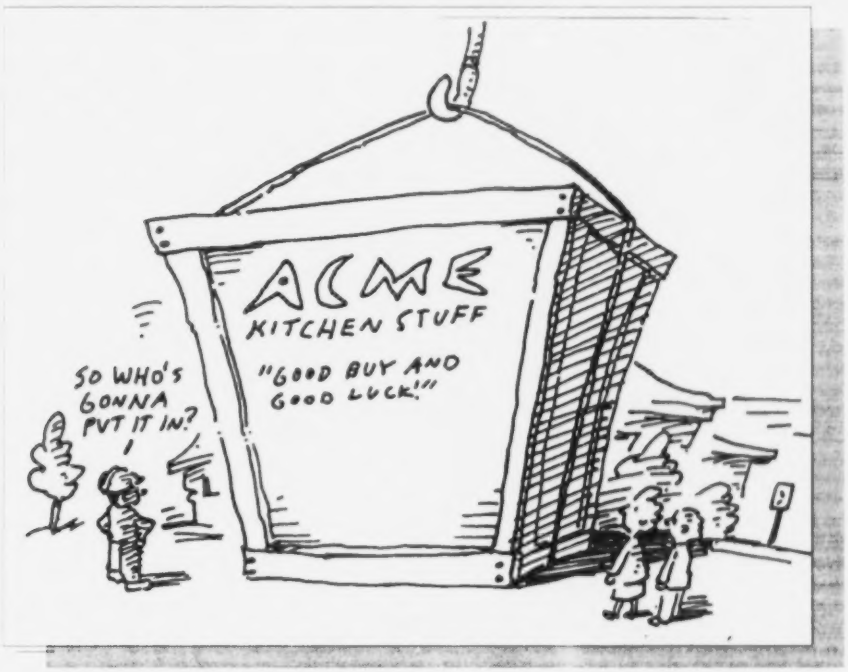
WHO BUYS AND INSTALLS THE EQUIPMENT?

SCHOOL DISTRICT BUYS / SCHOOL DISTRICT INSTALLS

- School district avoids Contractor mark-up on equipment
- Scheduling the installation is more convenient since it is performed "in-house"
- Early purchase of equipment may help project schedule
- School district has more control over equipment vendors

- Committing staff to large projects is difficult
- Finishing projects is difficult
- School district is responsible for coordinating utilities
- School district is responsible for scheduling deliveries and installation
- School district must supply purchasing function (expediting, shipping, receiving)
- May need different power supply than one available in school

Usually, if the equipment is furnished with a cord and plug it can be installed with ease by school district staff. If it is a duplicate replacement piece, the utilities will already be in place for re-connection of the new. If plumbing, electrical or mechanical work will be required or special measurements or attachments must be considered, it is best to let the contractor buy and install.



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WHO BUYS AND INSTALLS THE EQUIPMENT?

This is extremely important! Ask yourself the following questions before attempting to do-it-yourself. It should become clear which direction to take.

- Who will track down late or missing equipment?
- Who will schedule the delivery and who will receive the equipment?
- What if the equipment arrives damaged?
- Does the voltage and phase match the electrical service at the school?
- Is the equipment properly fused?
- Are motors running in the right direction? Three phase motors can run backwards if wired incorrectly.
- If it is "plug-in" equipment, does the plug shape match the plug available?
- Is the gas supply adequate to run the equipment?
- Will gas, water, or steam pressure regulators be required?
- Are water filters or line strainers required? If so, they must be checked for debris.
- Does the equipment and the installation meet the state and local plumbing, electrical, mechanical, fire, and health codes?
- Who will uncrate and set-in-place?
- Will the equipment fit through the doors or openings at the school?
- Will special equipment be required to get the equipment in the building?
- Is there proper clearance between equipment items? Some control panels are heat sensitive and must have "breathing" clearance to operate properly.
- Can the equipment be serviced after it has been set in place?
- Who will service the equipment?
- Are spare parts available in case of a break-down?
- Are special tools required to accomplish the installation?
- Who will calibrate the thermostats or controls?
- Does the equipment require special lubrication before operation?
- Who do you call if the equipment does not work!!??
- Who do you call if the refrigeration equipment does not work!!??
- Will the new equipment require a fire protection system?
- Who will initiate the warranty?
- Are there hidden packing materials that must be removed before hook-up?
- Who will clean and sanitize the equipment before initial usage? Equipment such as fryers, griddles, and tilting skillets require special cleaning techniques.
- Who will install "loose" parts or accessories such as vacuum breakers, solenoid valves, water flow controls, and starters which are furnished loose for installation to the school when a disposer is purchased.
- Who will demonstrate the proper operation of the equipment?
- Who will explain the proper maintenance and routine care of the equipment?

SAMPLE CHECKLIST FOR PLAN APPROVAL OF FOOD SERVICE

Please note that this list is only a sample. Regulations vary from location to location. Please check with your local heath department for specific regulations for your area.

■ **Kitchen Floors, Walls and Ceilings**
- ☐ floors of easily cleanable construction
- ☐ floor and wall junctures coved (rounded angles for easy cleaning)
- ☐ walls smooth and easily cleanable
- ☐ walls of approved material
- ☐ ceilings of approved material

■ **Fly, Gnat and Mosquito Control**
- ☐ all outside doors of self-closing type or equipped w/ approved fly fans
- ☐ all operable windows screened with 16 mesh screen wire

■ **Facilities for Kitchen Personnel**
- ☐ adequate number of toilets
- ☐ proper vestibule, floor drains
- ☐ hot and cold water supplied to lavatory, through a mixing faucet (110° F. minimum for hot water)
- ☐ toilet ventilation in accordance with regulations
- ☐ dressing area with lockers provided
- ☐ adequate handwashing lavatories in food preparation and utensil washing areas
- ☐ sanitary towel and soap dispenser installed

■ **Sewage Disposal**
- ☐ site approval by county health department, if septic tank and tile field proposed
- ☐ septic tank, tile field, and grease trap adequately sized (approved by environmental office)
- ☐ previous satisfactory operation approved by county health dept., if connection to existing tank proposed
- ☐ enlargement of system, if proposed, satisfactory
- ☐ local sewer authority clearance, if connection to municipal sewage system is required
- ☐ oxidation pond or package treatment plant, if proposed, approved by appropriate local and state authorities

■ **Sewage Collection System**
- ☐ cast iron soil pipe drains beneath and to a point 5 feet beyond building
- ☐ extra heavy cast iron pipe under drives, walkways and also under buildings over one story in height
- ☐ 4-inch and 5-inch pipe, minimum 1/8-inch per foot fall
- ☐ all pertinent invert elevations furnished

- ☐ fittings, venting, materials, joints, traps, clean-outs, back-water valves, hangers, supports in accordance with National Plumbing Code

■ **Water Supply and Distribution System**
- ☐ water from approved source
- ☐ system conforms to state building code
- ☐ no back siphonage potential
- ☐ insulation connections provided between pipes of dissimilar metals
- ☐ specifications call for adequate system
- ☐ disinfection and sampling
- ☐ all plastic pipe bears NSF Seal of Approval

■ **Heated Water Supply**
- ☐ primary water heater (140° F.) adequate
- ☐ 180° F. water to hot water sanitizing warewashers adequate
- ☐ booster heater adequate size
  - ☐ equipped with pressure-reducing valves (15 - 25 psi)
  - ☐ equipped with air cushion chamber fitting
  - ☐ located adjacent to dishwasher (within 5 feet)
- ☐ recirculation pump and necessary controls specified if generating system more than 25 feet from dishwasher or dishwasher's booster heater
- ☐ separate hot water operating and distribution systems for kitchen

■ **Kitchens and Lunchrooms**
- ☐ plumbing satisfactory
- ☐ floor drains:
  - ☐ where needed
  - ☐ in walk-in coolers, equipped with a backwater valve that is accessible for inspection and maintenance
- ☐ floors graded to drain
- ☐ lavatory with mixing faucet (with cold and 140° F. water) in working area
- ☐ service sink or mop basin (with cold and 110° F. water) accessible to working area
- ☐ dishwashing machine:
  - ☐ properly sized
  - ☐ timed-automatic, or larger
  - ☐ automatically dispensed detergent and sanitizer
  - ☐ pressure/temperature gauge on final rinse
  - ☐ meets requirements of applicable regulations
  - ☐ equipped with thermostatically controlled wash tank heating element
  - ☐ 1/4" i.p.s. gauge cock for checking manifold pressures
  - ☐ pressure gauge where water pipe enters rinse manifold
  - ☐ thermometer where water pipe enters rinse manifold

SAMPLE HEALTH DEPARTMENT CHECK LIST

- ☐ other dishwashing facilities:
  - ☐ 3-compartment sink of at least minimum size (large enough to immerse at least 2/3 the largest utensil)
  - ☐ adequate drainboards or dishtables, provided at both ends of sinks
  - ☐ dishbaskets provided for 3-compartment sink when hot water sanitizing is used
  - ☐ sinks, dishtables, and drainboards, constructed of approved materials
- ☐ storage shelving at least 6" above the floor
- ☐ storage room flats on casters

■ **Design, Construction, and Installation of Kitchen Equipment and Utensils**

- ☐ counter-mounted equipment sealed to counter or mounted on 4" legs
- ☐ floor-mounted equipment easily movable, sealed to floor, on raised platforms, or on 6" legs
- ☐ equipment sealed to wall or to adjoining equipment, or space to facilitate easy cleaning
- ☐ aisles, or work space between equipment, and between equipment and walls of sufficient width (double aisle- 60" min; single aisle - 30" min)
- ☐ existing equipment of satisfactory construction and condition
- ☐ adequate utensil and kitchenware storage area available
- ☐ counter tops, table tops, cutting boards, etc., of suitable materials
- ☐ effective, easily cleanable, sneeze guards or other counter protective devices (self-service in K-5 schools requires 27"-29" counter heights)
- ☐ adequate facilities for maintaining food at hot or cold temperatures
- ☐ running water - dipper well provided w/ air gap and indirect drainage

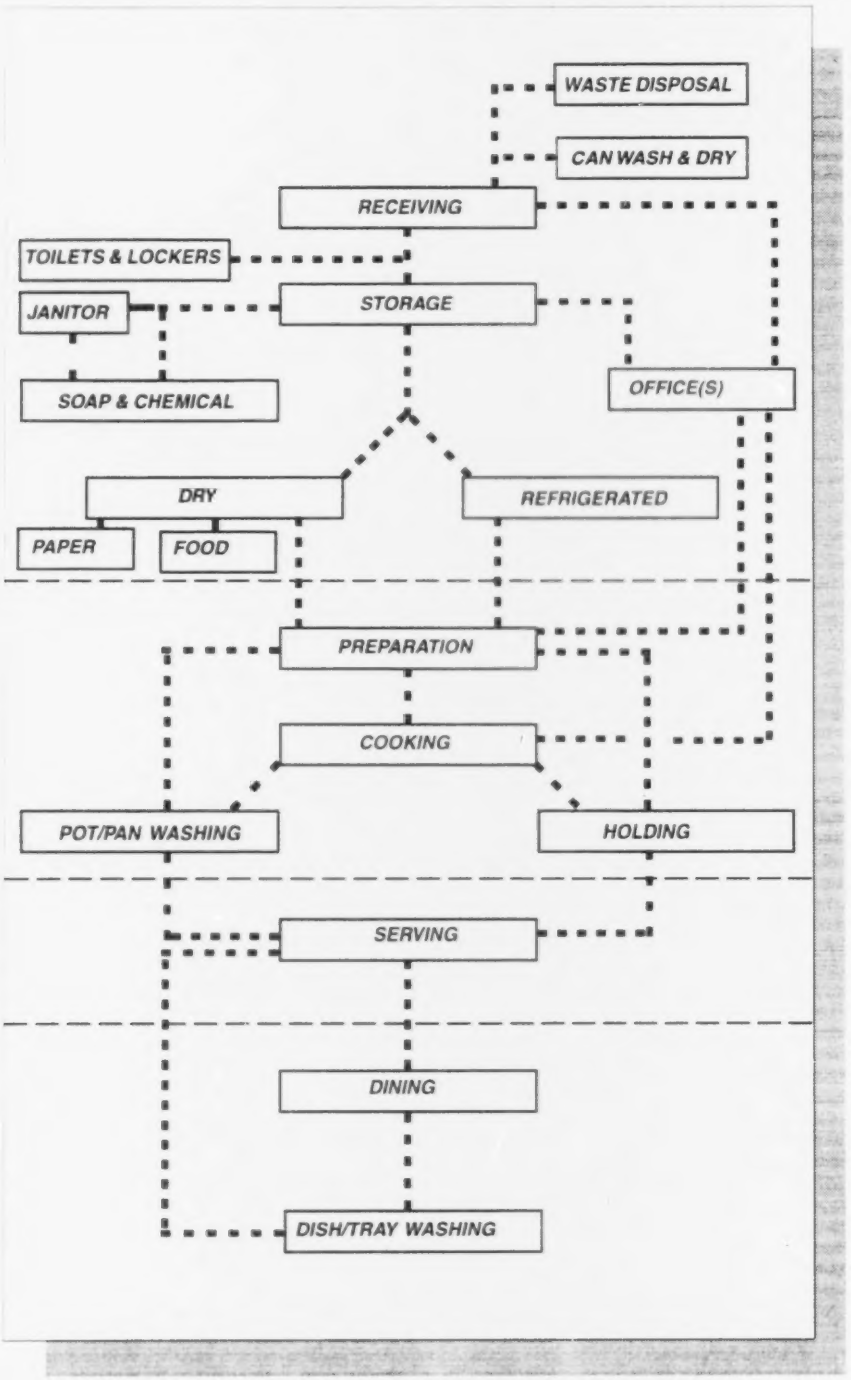
■ **Kitchen Ventilation**

- ☐ if range hood used, properly sized (minimum 6" overhang each side)
  - ☐ adequate make-up air provided if exhaust exceeds 1500 cfm
  - ☐ fan properly sized
  - ☐ adequate number of filters
  - ☐ ducts properly sized
- ☐ if dishwasher hood used, all components properly sized
- ☐ if hoods not used, other adequate ventilation
- ☐ range hood must meet NFPA 96 criteria

■ **Can Wash and Garbage Area**

- ☐ mixing faucet for tempered water in can-wash area
- ☐ drain correctly located
- ☐ floor slope to drain 1/4" to 5/8" per foot
- ☐ can-wash drain discharges through grease trap if final effluent to septic tank
- ☐ outside garbage cans stored at least 12" above ground or on concrete slab

FOOD SERVICE WORK FLOW & PROXIMITIES



THE LONG AND THE SHORT OF IT: SQUARE FOOTAGE (SF) REQUIREMENTS FOR ALL SPACES

AREA	MEALS SERVED PER DAY					
	200	200-400	400-600	600-800	800-1200	1200-1500
RECEIVING	40-50 SF	50-60 SF	60-75 SF	75-85 SF	85-100 SF	100-125 SF
CAN WASH/DRY	50	50-75	75-100	100-125	125-150	150-160
TOILETS/LOCKERS	100	200	200	200	225	250
JANITOR & CHEM/SOAP STORAGE	50	50-60	60-75	75-85	85-100	100-125
OFFICES	50	50-80	80-100	100-120	120-150	150-160
DRY STORAGE	200	200-300	300-400	400-500	500-600	600-700
REFRIG. STORAGE	130	130-200	200-300	300-400	400-600	600-750
PREP/COOKING	500	500-600	600-700	700-800	800-1000	1000-1250
POT & PAN WASHING	75	75-85	85-100	100-110	110-125	125-150
HOLDING & SERVING	250	250-400	400-800	800-1200	1200-1400	1400-1800
DINING	800	800-1600	1600-2400	2400-3200	3200-3600	3600-4500
DISH/TRAY WASHING	100	100-150	150-200	200-250	250-350	350-400

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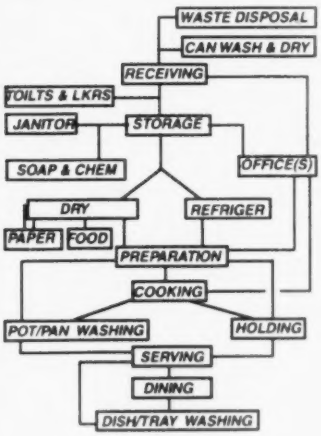
SPACE GUIDELINES



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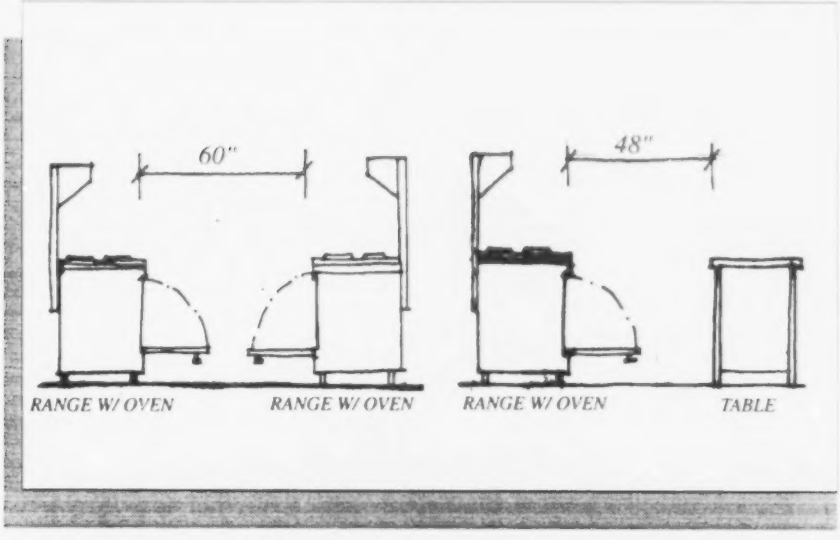
NOISE (OR SOME SOUND ADVICE)

In chapter 10 we discuss good and bad locations for the kitchen/dining in relation to the whole school facility. Basically, there are two concerns about noise levels in relation to the kitchen and dining areas. First, there is the noise that is produced in the kitchen and that travels into the dining area. Second, there is the noise produced by the kitchen and dining area that affects adjacent classrooms and other related academic facilities. Let's take a moment here to see what can be done to minimize noise levels.

- Hard floors, walls and ceilings bounce or reflect sound--making a bad situation worse. To lessen the impact of tile floors and walls, sound-absorbent materials such as acoustical ceiling tiles, sound-absorbent pin-up boards in dining areas, and even cloth covered blinds over large areas of plate glass can be used.
- Sound insulation in walls/ceilings will also help reduce the level of noise traveling from the kitchen and/or dining to other spaces in the school.
- Separate dining areas from serving and dish return areas. Kitchen noise will not be as noticeable in dining area.
- Use chairs with noise resisting feet (glides) to lessen noise of moving furniture on a hard floor surface.
- Disposable trays/utensils will create less noise.
- And lastly, you might do what restaurants do and use a low level of music as background to mask other noise and put students in a good humor. Just avoid hard rock music please!

AISLE ALLOWANCES

This will be discussed more in Chapter 5 in relation to equipment but it does play a role in space allocation and design. Throughout this document we give minimum aisle space as being 36" with desired aisle space as being 42" or in some cases 48". Larger aisles up to 48" can be especially helpful in storage areas and for compliance with the Americans with Disabilities Act (ADA). Beware though, too much aisle space is almost as bad as too little. The goal is to strike the right balance between workability and efficiency.



Take into account what appliances or equipment are facing each other across the aisle. Two ovens might be across from each other. The aisle space must then accommodate the oven doors opening into the space from both sides of the aisle.

- *A Single aisle should be 36" - 48" (42" standard).*
- *Main aisles of employee or receiving/storage traffic should be 48" - 72" in width.*
- *A Double aisle (the space between two appliances or pieces of equipment) should be 36" - 52" (48" standard).*

SECURITY

It's something we really don't want to think about, but the sad fact is that security must be considered when designing school food service areas. Theft does happen and there is much that can be done to maximize security and minimize theft (and most of it is common sense):

- Location of manager's office should have visual access to storage/loading area
- Access doors need to be kept locked and a buzzer/intercom provided on receiving door from loading dock/trash disposal area
- Limit the number of doors into all storage areas
- Locks in area should not be part of master system
- Location of electrical breaker boxes should not be in dry storage areas
- Provide locks on windows
- Provide separate rooms for plumbing, mechanical and electrical equipment

COLOR

Color affects worker moral in the kitchen and students' behavior and eating habits in the dining area. Color and lighting should be looked at together. In general, if people (fleshtones) look good, food will also look good.

Some important factors to consider:

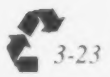
- Try to achieve balance with lighting and color, avoid too bright, too dim.
- Balance indirect lighting with direct lighting.
- Trendy colors should be avoided in more expensive unchangeable finishes. Color trends seem to change approximately every eight years.
- White and stainless steel can be overly institutional for many employees. Give kitchens some color! Keep in mind some health departments require kitchen walls to be of a light color.
- Cafeteria should be part of overall color scheme of school (this is easiest to achieve in new construction).

- *Light/cool colors recede (expand sense of space)*
- *Warm colors advance (make a space seem smaller, good highlights)*
- *Bold primary colors - fast turnover*
- *Pastel colors - calm atmosphere*
- *Muted, subtle colors - leisurely, restful*
- *Cool colors - warmer climate*
- *Warm colors - cooler climate*

FINISHES

Each space described in this chapter has a section titled "The Finish Line" which outlines material choices in order of preference (and usually cost) for that particular space.

Many states regulate allowable finishes in food service, toilet room, food preparation and utensil washing areas. Most regulations require all surfaces in areas dealing with food and utensils to be:

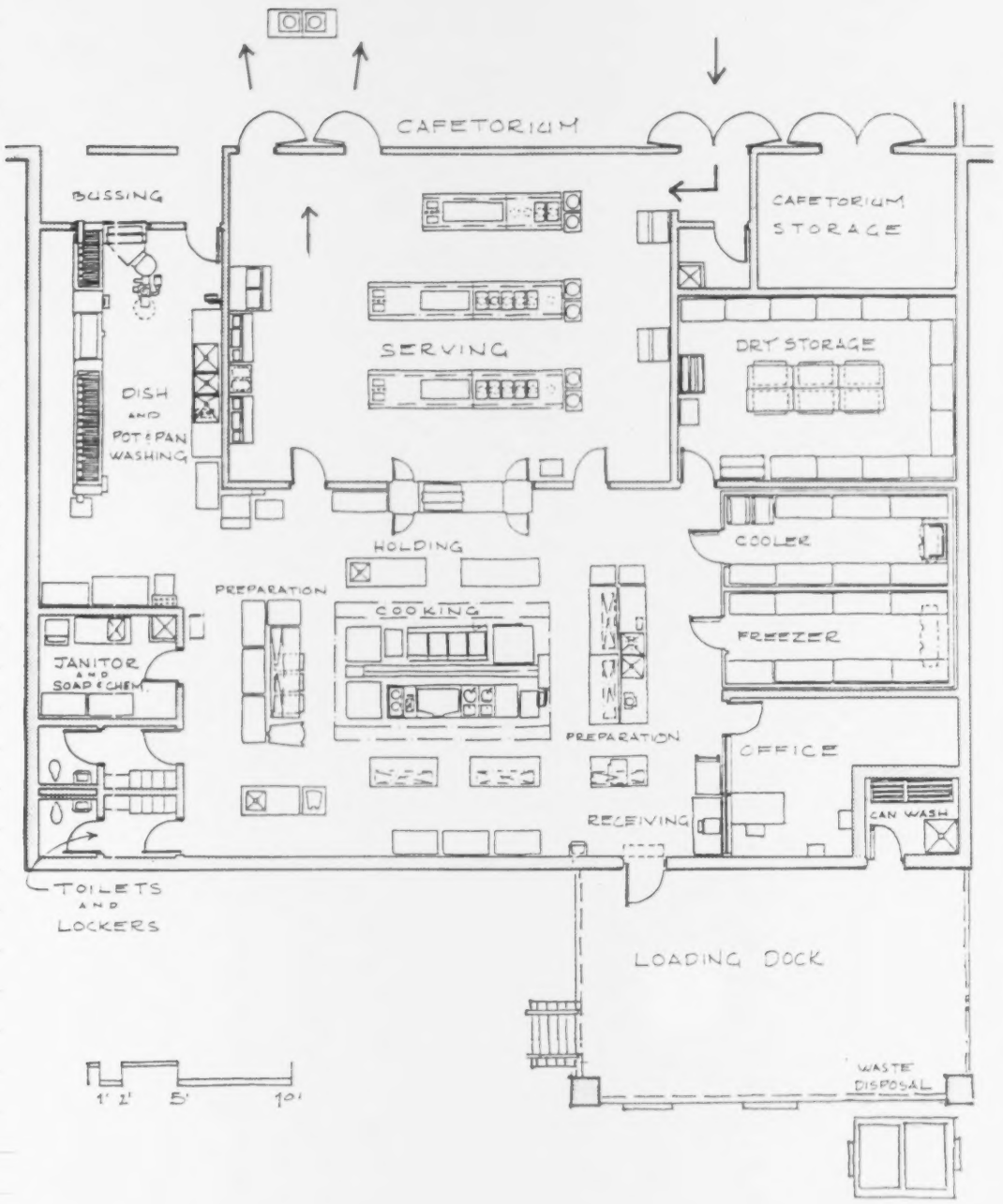


- easily cleanable.
- having walls and floor junctures coved (no hard to clean right angles).
- walls to be smooth (no open pores or cracks).
- ceilings to be smooth (no open pores or cracks) or to have replacable ceiling panels.

The above requirements generally mean that untreated concrete block is not an acceptable finish for the cooking, preparation or serving areas. This is because this material has open pores or cracks that are not considered sanitary or cleanable. Concrete blocks or other masonry products used for wall construction in these areas shall be trowelled, skim coated, or receive sufficient coats of full strength block filler to render a smooth surface prior to the application of a washable paint. Walls of rooms used for the storage of food, single-service and single-use articles, utensils, and equipment shall be sealed or painted; except that, rooms used only for the storage of unopened packages or containers shall be exempt from this requirement.

For all floors it is recommended that the material be slip-resistant and non-absorbent. Floors carrying heavy equipment loads should also have finishes which will take these loads without cracking or crushing. Base materials should always be coved for easy cleaning. When using quarry or ceramic tile specify flush grout joints in a dark color. Grout joints that are too low catch food and dirt and are very difficult to clean. White or light color mortar shows all stains and dirt.

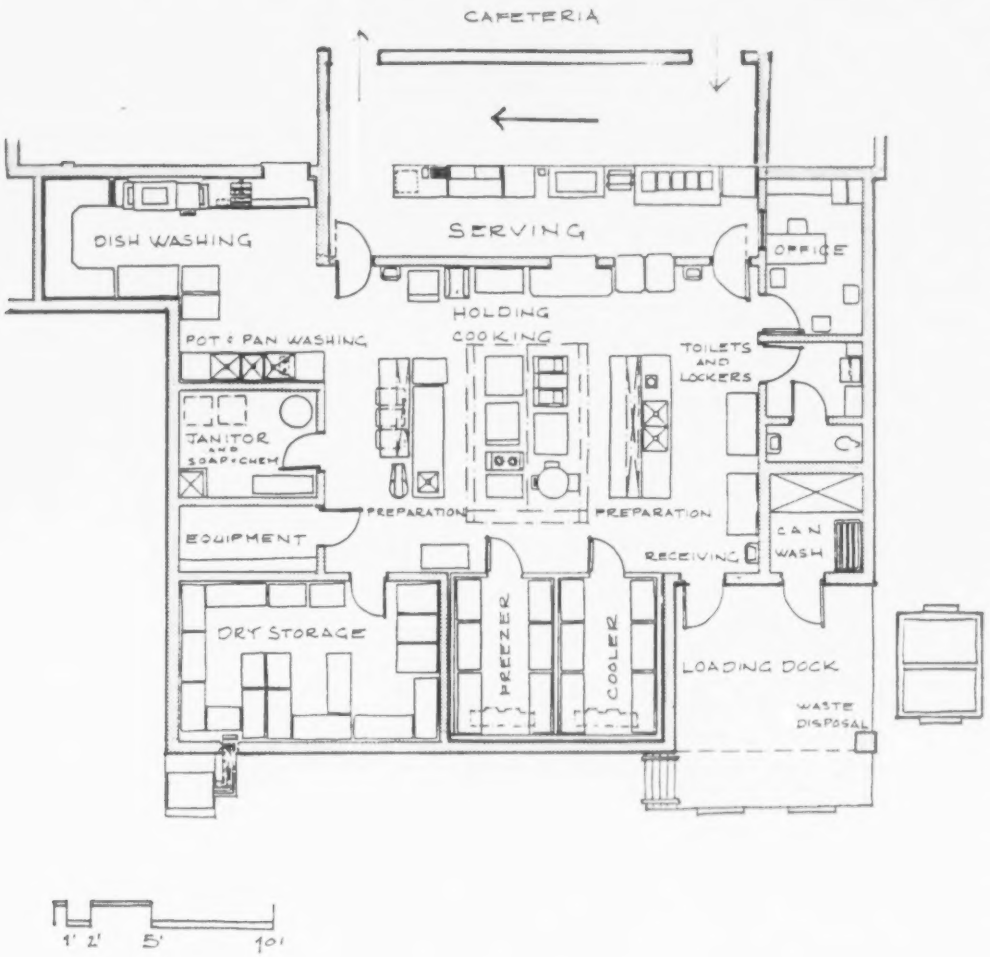
PROTOTYPE PLAN: FOOD SERVICE FOR 800-1200



Source: Plan provided by Adams Design Associates, Architects and Roger Johnson, Food Service Consultant.

Note: This plan is provided for reference purposes only. It is not considered a "perfect" or "model" plan and the National Food Service Management Institute does not endorse its use.

PROTOTYPE PLAN: FOOD SERVICE FOR 400-500



Source: Plan provided by Adams Design Associates, Architects and Roger Johnson, Food Service Consultant.

Note: This plan is provided for reference purposes only. It is not considered a "perfect" or "model" plan and the National Food Service Management Institute does not endorse its use.

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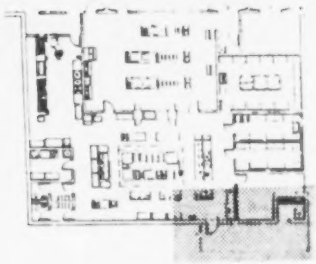
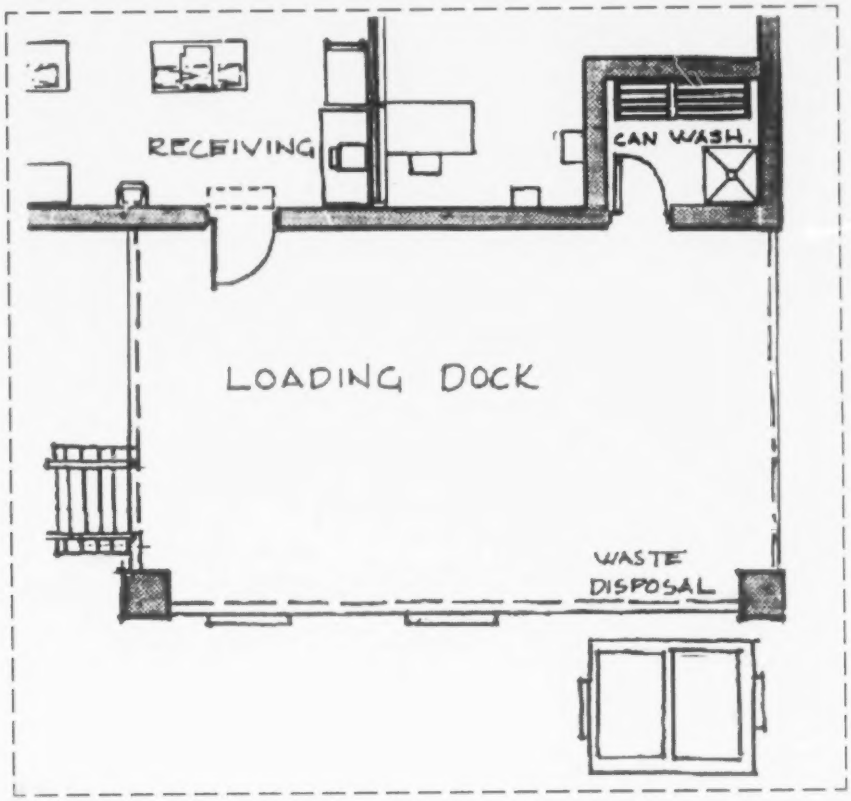
RECEIVING & WASTE DISPOSAL

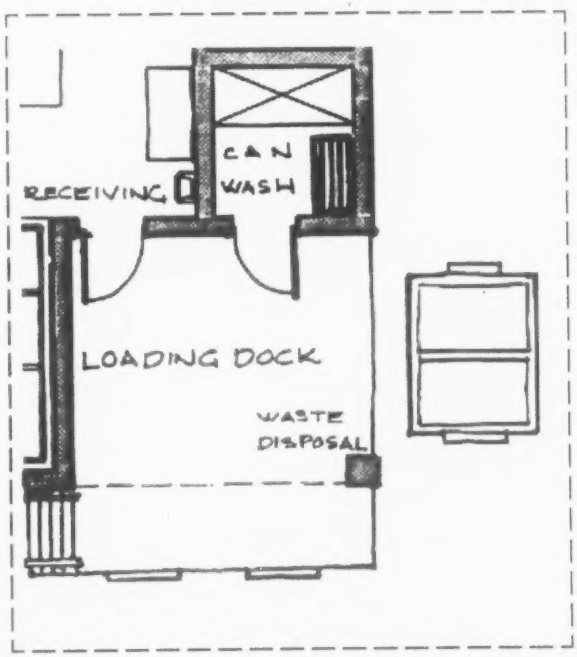


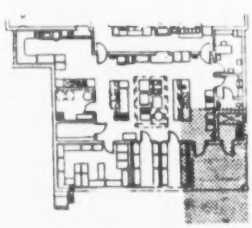


***Receiving** is the service entrance to the kitchen. It begins at the loading dock where food and non-food products are delivered from trucks and includes the entrance door and interior vestibule.*

It includes:

- *Loading Dock*
- *Dumpster Pad*
- *Can Washing Area*
- *Kitchen Entrance Door*
- *Interior space for checking orders*





THE BIG PICTURE: DESIGN OBJECTIVES

- Receiving area should help deliveries run as smoothly as possible, especially during disruptive times such as lunchtime deliveries.

PROXIMITIES

- Interior vestibule should be convenient to the storage facilities.
- Top of dumpsters should be located to have easy access from loading dock.

THE LONG AND SHORT OF IT: SQUARE FOOTAGE

AREA	MEALS SERVED PER DAY					
	200	200-400	400-600	600-800	800-1200	1200-1500
RECEIVING	0-50	50-60	60-75	75-85	85-100	100-125
CAN WASH/DRY	50	50-75	75-100	100-125	125-150	150-160

- Loading dock size should be a minimum of 8' deep. Length should be determined by the number of trucks expected at any one time multiplied by the width of these trucks (usually 10' - 15' per truck). A rule of thumb is to provide space for two trucks for schools serving 300 or less meals per day. Add space accordingly for additional meals based on delivery schedule.

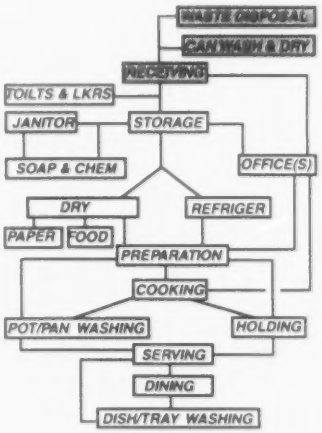
THINGS TO THINK ABOUT

- Trucks should have easy access to loading dock and dumpster pad. Trucks should not block parking or automobile traffic while making deliveries or picking up trash.

A worst case scenario of loading dock location:

4-11

SPACE GUIDELINES



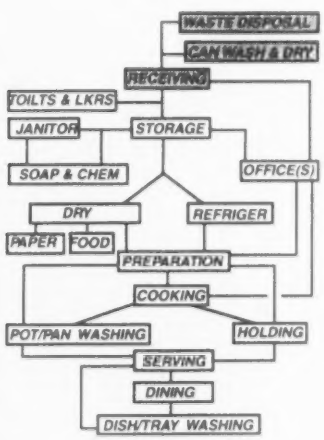
- Loading dock should be covered to provide adequate weather protection. The roof should be higher than the top of the tallest truck to unload there (usually 12' - 6" above grade).
- Loading dock floor level should be same level as kitchen to facilitate the delivery of equipment, food stuffs, etc. These ideally should be on the first floor of the facility.
- Loading dock should be 3'- 0" to 3'-6" above grade to allow for easy unloading of deliveries. Use concrete steps for a raised dock. Steps should be placed away from trucks to avoid truck damage. If a higher dock is not possible, one at grade level will be sufficient.
- Loading dock should have bumper pads to provide building protection.
- Entrance door should be at least 42" wide to allow passage of equipment and supplies. Double doors with no center post are useful in moving large cartons and equipment. An 8'-0" high door will allow equipment to move through without the need to remove compressors and other attachments.
- Interior space should be provided for checking in supplies. A minimum amount of space is needed here. Excess space will only become an area to collect junk.
- Kitchen entrance door should have a bell for use when door is locked. A window in this door is useful. Provide kick plates on both sides of door.
- Hand trucks and portable carts will be used in this area. Corner protection for walls will reduce damage.

THE FINISH LINE

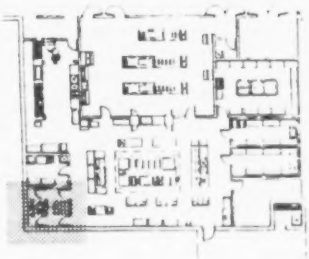
- In general, all surfaces in loading dock area, dumpster pad, can washing and interior vestibule should be cleanable and extremely durable. These areas take a lot of abuse from trucks, hand carts, water, etc. Common sense material choices are concrete, concrete block, brick, and glazed brick/block/tile.
- Interior vestibule surfaces should have coved (rounded) corners.

TO SHED SOME LIGHT ON THE SUBJECT

- As most of this area is an exterior area, natural light is not a big concern.
- A window in the entrance door is useful for keeping tabs on people and deliveries and will also let some natural light into the receiving vestibule.



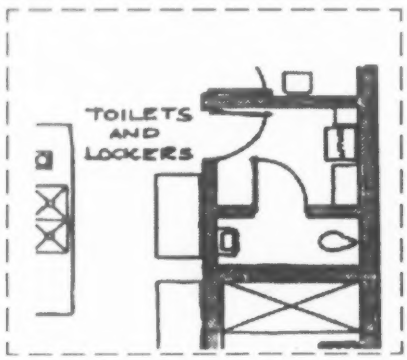
TOILETS AND LOCKERS

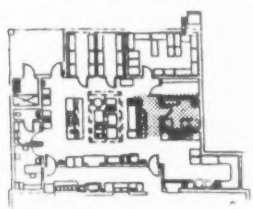


The ***Toilets and Lockers*** *area is provided for employee use. Separate facilities may be provided for men and women or one unisex area may be all that is needed.*

This area includes the following:

- *Locker area with space for notices, benches, and possibly a pay phone in large kitchens.*
- *Toilets.*





TOILETS AND LOCKERS

THE BIG PICTURE: DESIGN OBJECTIVES

- No high and mighty design objectives here...just the requirements for comfortable employee facilities that are convenient to use.

PROXIMITIES

- The area with toilets and lockers should be located adjacent to the kitchen and near serving areas.

THE LONG AND SHORT OF IT: SQUARE FOOTAGE

AREA	MEALS SERVED PER DAY					
	200	200-400	400-600	600-800	800-1200	1200-1500
TOILETS/LOCKER	100	200	200	200	225	250

THINGS TO THINK ABOUT

- Codes specify that toilet areas shall not open directly into kitchen areas, so a small vestibule is usually provided. To avoid the vestibule being wasted space, it can be enlarged to serve as the employee locker area.

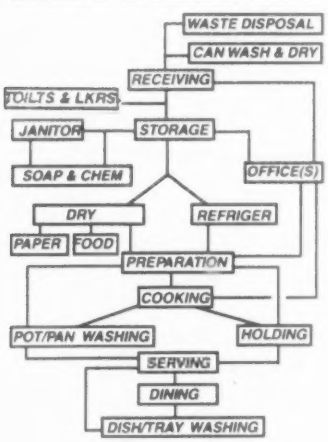
THE FINISH LINE

- As this is a "wet area" - finishes should reflect this. Choices in order of preference are as follows:

  Floor: Quarry tile, ceramic tile
  Base: Quarry tile, ceramic tile
  Walls: Ceramic tile, glazed brick/block, epoxy painted block, epoxy painted gypsum board
  Ceiling: Acoustical tile

4-14

SPACE GUIDELINES



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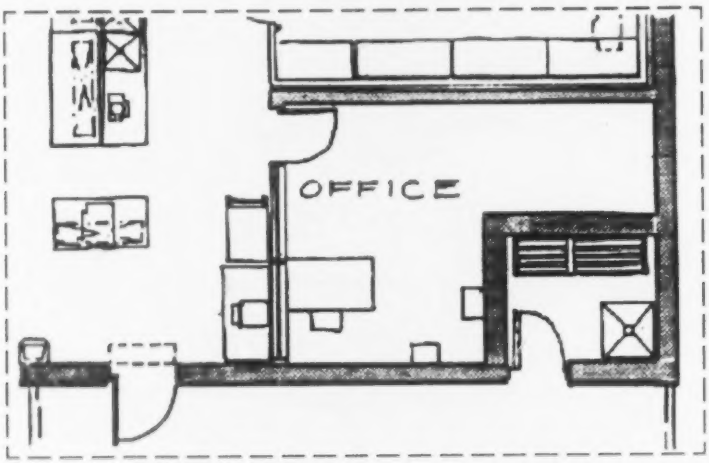
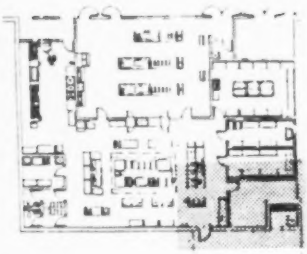
OFFICE(S)

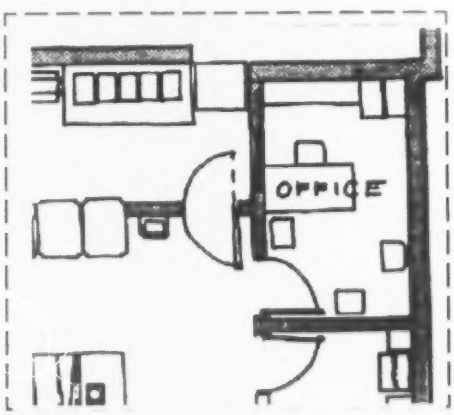


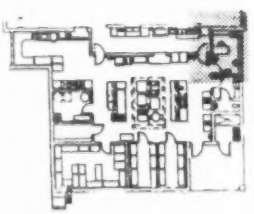


*The **Office** areas are provided for the school food service manager and other school food service employees as each school deems necessary.*

They include the following:

- *Record storage area*
- *Inventory clerk space*
- *Computer area*
- *Manager's office*





OFFICES

THE BIG PICTURE: DESIGN OBJECTIVES

- The manager's office should be a separate room. It should be a comfortable work environment and sufficient in size to accommodate all the equipment and supplies needed to perform tasks.

PROXIMITIES

- The office should be located to give the manager the best view possible of most kitchen operations. It should be near receiving and storage and should have a view of the food preparation/cooking areas.
- Offices and storeroom functions are not compatible - don't put the manager's desk in the storeroom.

THE LONG AND SHORT OF IT: SQUARE FOOTAGE

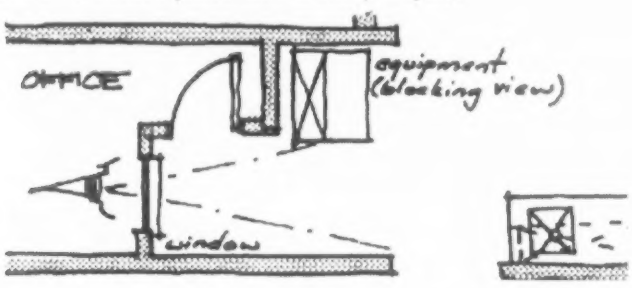
AREA	MEALS SERVED PER DAY					
	200	200-400	400-600	600-800	800-1200	1200-1500
OFFICES	50	50-80	80-100	100-120	120-150	150-160

- Don't skimp on space here. The computer age has made most offices more than 4 years old woefully inadequate in size. If you look at everything that must fit here you will see you should be generous with this space.

THINGS TO THINK ABOUT

- View windows to kitchen preparation/cooking and receiving areas are a must for the office. Kitchen equipment should be coordinated so you don't have a 7' tall refrigerator in front of the manager's window and that manager can see out window when he/she is in a seated position.

Make sure window placement is really useful...



THE FINISH LINE

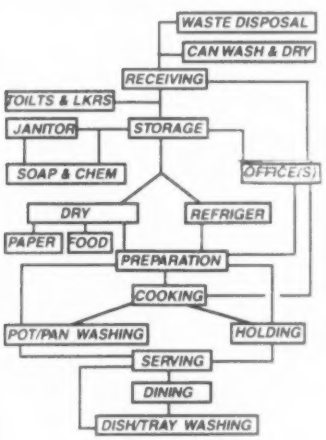
- Gypsum walls and vinyl tile flooring are fine here. Ceiling can be regular acoustical lay-in tile.

TO SHED SOME LIGHT ON THE SUBJECT

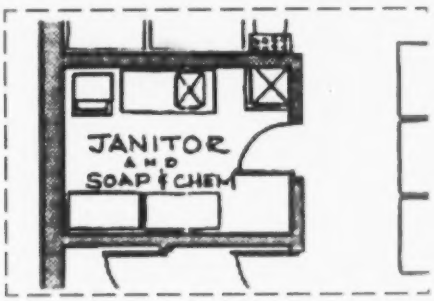
- As in any office, natural light is nice. Exterior windows here will also be a secondary natural light source to the kitchen area itself.

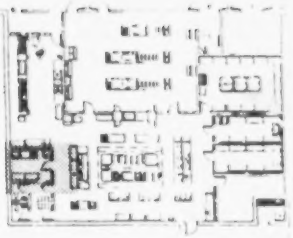
4-16

SPACE GUIDELINES



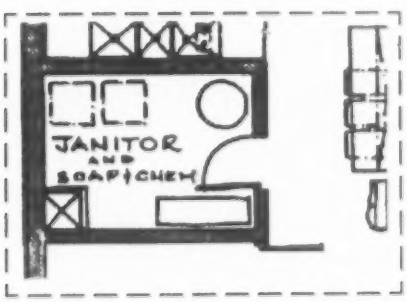
STORAGE: SOAP AND CHEMICAL/JANITOR

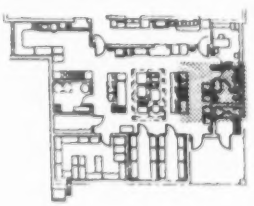




Soap and Chemical Storage houses cleaning supplies in case lots, bulk packages and broken case lots on shelving and pallets, or dunnage racks.

Janitor area includes space for a mop rack, mop sink and perhaps a washer/dryer and laundry counter.





STORAGE: SOAP AND CHEMICAL/JANITOR

THE BIG PICTURE: DESIGN OBJECTIVES

- Soap and Chemical Storage and Janitor area serve to keep toxic chemicals and cleaning supplies separated from food items.

PROXIMITIES

- Soap and chemical storage should be convenient to pot washing and dish washing.
- Soap and chemical storage should be in a dedicated area separate from food storage. Check local health department requirements.
- Paper goods storage is usually combined with food storage.

THE LONG AND SHORT OF IT: SQUARE FOOTAGE

AREA	MEALS SERVED PER DAY					
	200	200-400	400-600	600-800	800-1200	1200-1500
JAN./CHEM STOR.	50	50-60	60-75	75-85	85-100	100-125

- The size of storage should be decided according to delivery schedule and inventory needs.

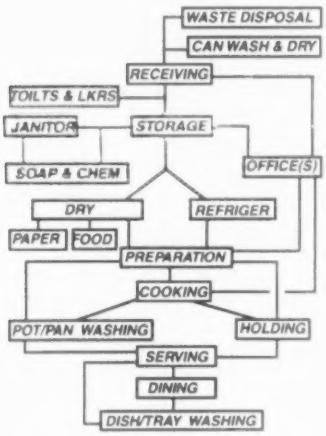
THINGS TO THINK ABOUT

- Aisles in soap and chemical storage should be large enough for hand trucks and carts: 36" minimum, 42"-48" desirable.
- Doors should have locks to prevent theft.
- Dunnage racks should equal 1/2 the total linear storage space provided.

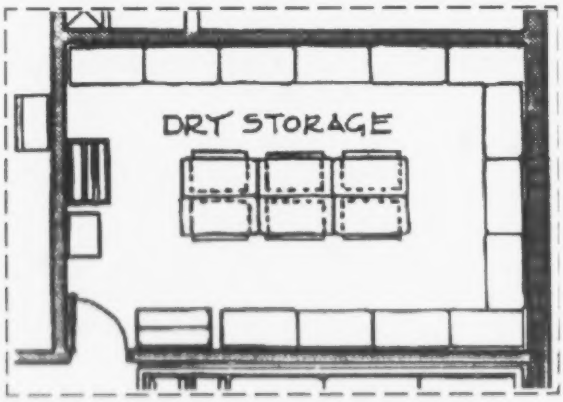
THE FINISH LINE

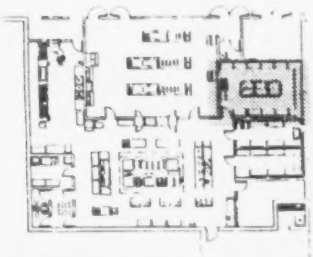
- Finishes should be impervious to chemical spills and water.
- Choices in order of preference are:

Floor: Quarry tile, ceramic tile, sheet vinyl, VCT
Base: Quarry tile, ceramic tile, vinyl
Walls: Ceramic tile (at least around mop sink), glazed brick/block, epoxy painted block, epoxy painted gypsum board
Ceiling: Acoustical tile



STORAGE: DRY FOOD AND PAPER GOODS



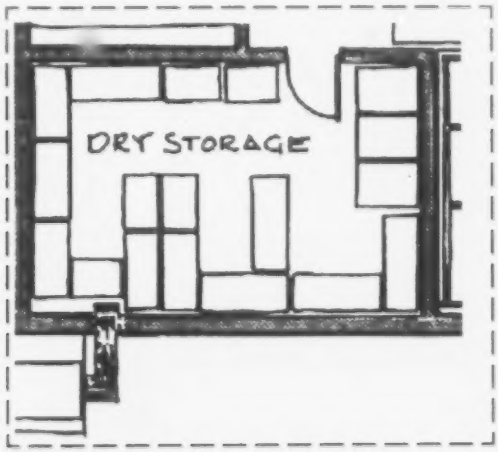


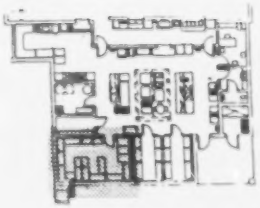
Dry Food Storage is the space necessary for the orderly storage of consumable items that do not require refrigeration.

Paper Storage is the space necessary for the storage of extra paper goods, utensils, etc., of a non-chemical nature.

They include the following:

- *Storage to hold case lots, bulk packages and broken case lots.*





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STORAGE: DRY FOOD AND PAPER GOODS

THE BIG PICTURE: DESIGN OBJECTIVES

- Dry food and paper goods storage should provide a clean, secure, vermin-proof room for the storage of cans, jars, and sacks.

PROXIMITIES

- Dry storage should be accessible from the receiving area without having to cross the food preparation area.
- Dry storage should be adjacent to the preparation area and the coolers and freezers to minimize the distance of bringing supplies to preparation.
- Dry storage should be located to be visible from food service manager's office to minimize danger of pilferage.

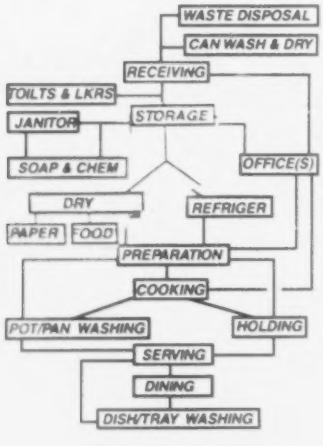
THE LONG AND SHORT OF IT: SQUARE FOOTAGE

AREA	MEALS SERVED PER DAY					
	200	200-400	400-600	600-800	800-1200	1200-1500
DRY STORAGE	200	200-300	300-400	400-500	500-600	600-700

- Size this area according to the frequency of deliveries and inventory needs.
- Deliveries of USDA donated foods should be taken into consideration.
- Provide for storage of mobile carts and racks when not in use.
- Space should be planned by usable shelving square footage. **A rule of thumb is to provide approximately 1 sq. ft. of shelf space for each student meal.** This should be enough to allow for paper storage. In schools serving over 250 meals, the addition of 1 square foot of space for each ten meals per day for paper storage should be considered.
- Also consider what foods are used the most - raw or completely processed.
- Larger storage can cut transportation cost (fewer deliveries which may make a big difference in rural areas where deliveries are more difficult to schedule) and cut food prices through bulk buying.

THINGS TO THINK ABOUT

- Aisles should be large enough for hand trucks and carts: 36" minimum, 42"-48" desirable.
- Storeroom doors should be 42" wide.
- Storeroom door locks should be keyed separately from school master system.
- Storeroom doors should be of solid construction and heavy duty.
- Insulate exterior walls of storeroom.
- Insulate any pipes going through storeroom.
- Provide view windows into storeroom to discourage theft but coordinate carefully with equipment and shelving placement.
- Dunnage racks or pallettes maximize storage space by stacking items and should equal up to 1/2 of linear storage space.

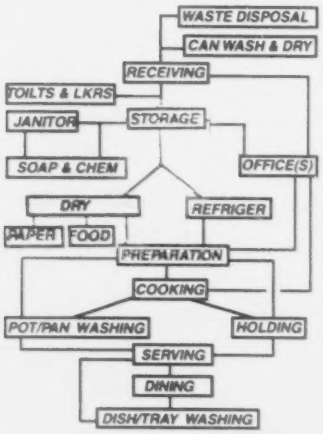


STORAGE: DRY FOOD AND PAPER GOODS

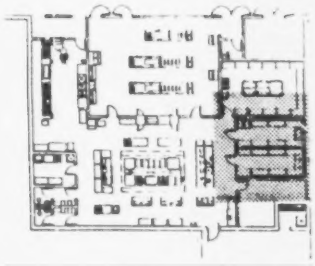
THE FINISH LINE

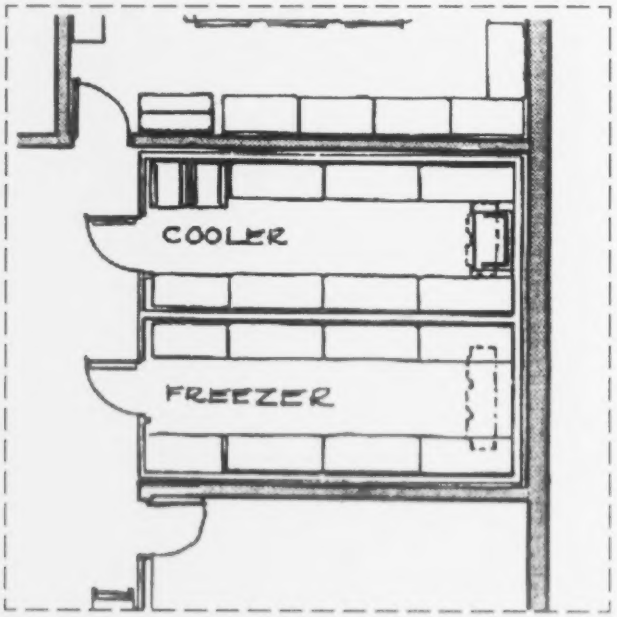
- Rodent and vermin control should be considered when selecting floor, wall, and ceiling materials.
- Choices in order of preference are:

Floor: Quarry tile, ceramic tile, sheet vinyl, VCT
Base: Quarry tile, ceramic tile, vinyl
Walls: Ceramic tile, glazed brick/block, epoxy painted block, epoxy painted gypsum board
Ceiling: Acoustical tile



STORAGE: REFRIGERATED





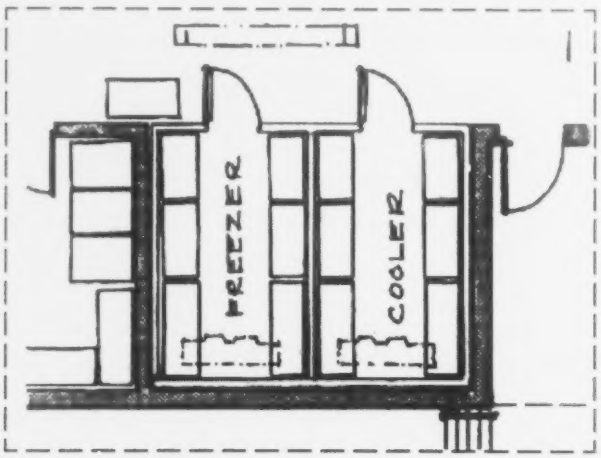
***Refrigerated Storage** is the area necessary to install equipment to house frozen and refrigerated food products in case lots, bulk packages and broken case lots.*

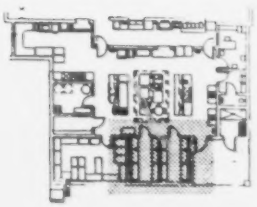
It includes the following:

- *Space necessary for walk-in coolers*
- *Space necessary for walk-in freezers*

4-22

SPACE GUIDELINES





STORAGE: REFRIGERATED

THE BIG PICTURE: DESIGN OBJECTIVES

- Provide adequate space for modular pre-fab refrigerated storage units.

PROXIMITIES

- Refrigerated storage should be accessible from the receiving area and adjacent to the preparation area without having to cross the food preparation area.

THE LONG AND SHORT OF IT: SQUARE FOOTAGE

AREA	MEALS SERVED PER DAY					
	200	200-400	400-600	600-800	800-1200	1200-1500
REFRIG. STOR.	130	130-200	200-300	300-400	400-600	600-750

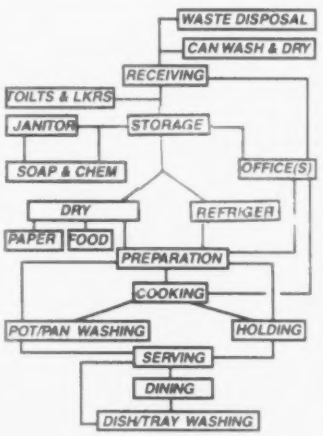
- **Size this area according to the frequency of deliveries and inventory needs.**
- Deliveries of USDA donated foods should be taken into consideration.
- Space should be planned by usable shelving square footage: approximately 1sq. ft. of shelf space for each student meal divided equally between the cooler and the freezer (verify with child nutrition director). Be generous when planning space here. **This is an expensive space to make additions to in the future.**
- Larger storage can cut transportation cost (fewer deliveries which may make a big difference in rural areas where deliveries are more difficult to schedule) and cut food prices through bulk buying.

THINGS TO THINK ABOUT

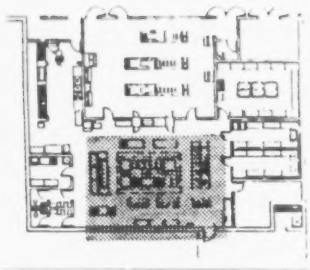
- For additions and renovations, walk-in coolers and freezers can be located outside when interior space is not available. When this occurs the walk-in doors should open into the building to avoid having to go outside. These can only be used for covered goods and case products.
- Provide adequate space for future growth and changing buying habits from the very start. Generally, more freezer space than cooler space should be provided.
- Aisles of walk-in coolers and freezers should be large enough for hand trucks and carts. 36" minimum, 42" - 48" desireable. Avoid aisles over 48" since it is foolish to refrigerate aisle space!
- Walk-in cooler and freezer floors should be level with the adjacent kitchen floor to allow free movement of hand trucks and carts.
- Dunnage racks providing up to 1/2 the linear storage space should be provided.
- When planning this space, remember that units can be installed side by side or back to back (which can be more energy efficient).

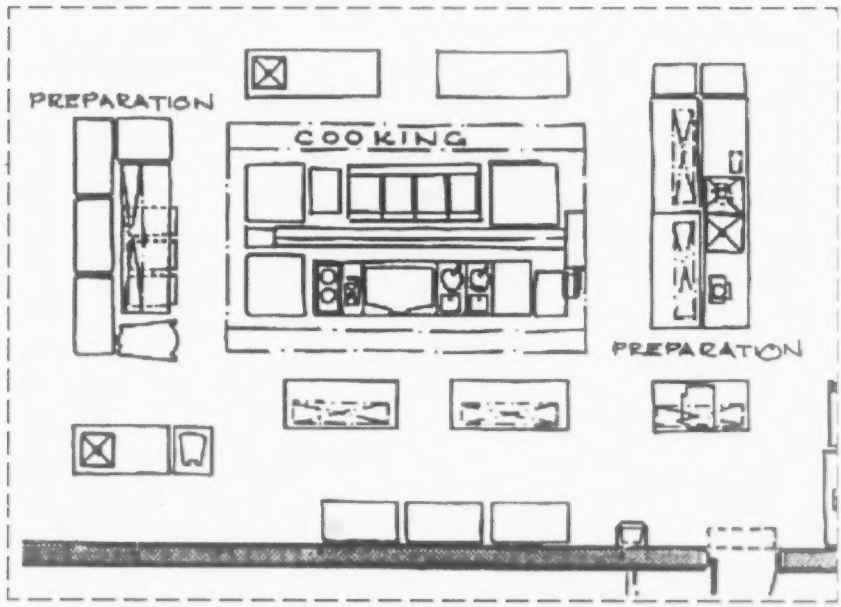
THE FINISH LINE

- Finishes are specified as part of the equipment. See Chapter 5.



PREPARATION/COOKING

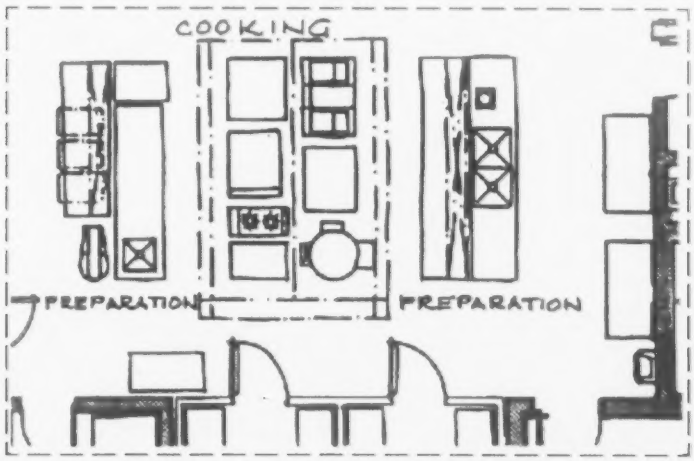


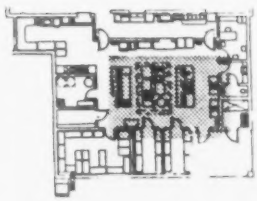


Preparation/Cooking is the space provided for the total processing of foods from raw to ready-to-eat. It is the heart of the entire production process.

It includes the following:

- *Vegetable preparation area*
- *Baking area*
- *Meat Preparation area*





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THE BIG PICTURE: DESIGN OBJECTIVES

- Kitchens are worthy of the same consideration that you would give any employee work area. The environment of the food preparation area is critical to its productivity, and by this measure, its success. They should be planned to utilize space, time and labor as well as possible. Factors influencing this are flow of work, adequate equipment and placement of equipment. Kitchens should be designed giving as much consideration to visual appeal and material finishes as to spatial organization of equipment and workstations.

PROXIMITIES

- Should be located convenient to food storage, holding and serving areas.

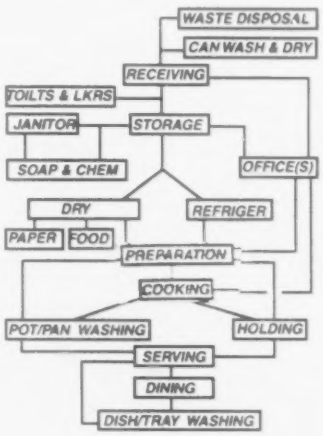
THE LONG AND SHORT OF IT: SQUARE FOOTAGE

AREA	MEALS SERVED PER DAY					
	200	200-400	400-600	600-800	800-1200	1200-1500
PREP/COOKING	500	500-600	600-700	700-800	800-1000	1000-1250

- While the chart above is helpful in getting a general idea of the square footage requirements, the necessary preparation space can be determined accurately only by making a functional layout. Equipment selected for use will determine the preparation area size and shape. Too much space will cause extra steps, too little creates confusion and crowding.
- Proportions of this space will be determined by actual equipment placement but rectangular kitchens are usually best with a ratio of length to sides of about 3 to 2. Exceeding a 2 to 1 ratio of length to sides usually requires considerably more walking and square footage.
- Provide space for the parking of portable carts and racks at each work station.
- Beware of the placement of structural columns to avoid wasted space.

THINGS TO THINK ABOUT

- Provide adequate aisle space for movement of portable carts: 36" minimum - 42" desirable when one person is working. Provide 48" minimum - 54" desirable when two people will work back-to-back.
- Aisle widths should be large enough to allow free movement of employees and related carts and racks. Provide adequate space for each work area so that each employee will have a dedicated working space.
- All corners of work surfaces should be coved for ease of cleaning. Use 1/4" radius minimum to 5/8" - 3/4" radius desirable.
- The overall design and placement of equipment should be flexible enough to allow for a changing menu.
- Provide sufficient landing space for food being removed from the cooking equipment.



- No traffic flow should go through the cooking area. Pots and pans are hot when being removed from the equipment and danger of burns and spills cannot be stressed enough!

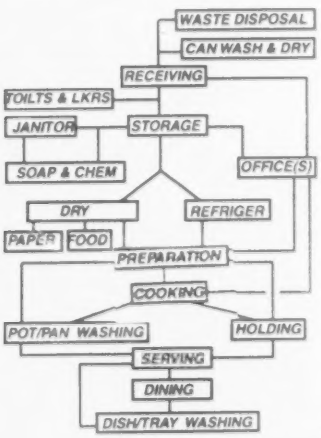
THE FINISH LINE

- This can be a noisy area with all of the hard surfaces. Take this into consideration when choosing finishes.
- Colors of walls and floors affect employee moral - be thoughtful here.
- Avoid materials that will rust, corrode and that will not withstand abuse. Stainless steel is usually less expensive over an extended period of time.
- Rodent and vermin control should be considered when selecting floor, wall and ceiling materials.
- Choices in order of preference are:

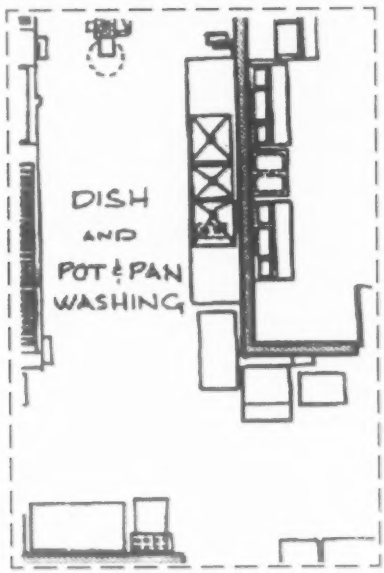
  Floor: Quarry tile, ceramic tile, sheet vinyl
  Base: Quarry tile, ceramic tile, vinyl
  Walls: Ceramic tile, glazed brick/block, epoxy painted block
  Ceiling: Vinyl clad acoustical tile (no open pores or voids)

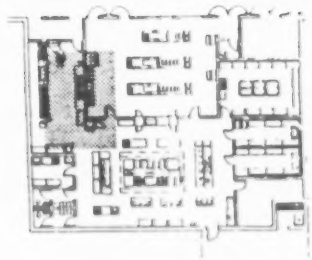
TO SHED SOME LIGHT ON THE SUBJECT

- Natural lighting is an important component of a well-designed, user friendly preparation area. Just as windows are provided in classrooms and offices, windows in the kitchen work area serve to supplement the artificial lighting and give employees a connection with the environment.
- Windows should be located and sized for the sill to clear any proposed equipment. Coordinate this carefully with equipment placement.
- Sharply sloping interior window sills will prevent the accumulation of items on sills.

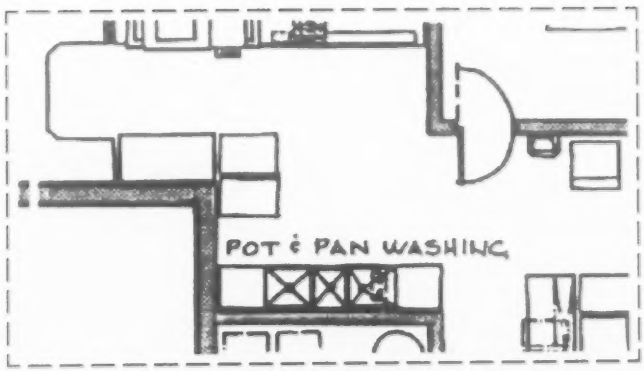


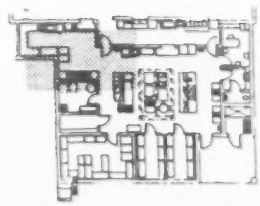
POT AND PAN WASHING





Pot and Pan Washing area is space provided for washing of equipment and utensils used in preparing and serving food.





POT AND PAN WASHING

THE BIG PICTURE: DESIGN OBJECTIVES

- Pot and pan washing should be out of the preparation and cooking areas but yet convenient to both. A good location is usually near or in the dishwashing area since this is a "wet" operation.

PROXIMITIES

- Should be convenient to the serving area for returning soiled serving pans.
- Should be convenient to preparation and cooking.
- This can be a noisy area so it should be located with that in mind.
- Locate the operation near the dishwasher so that pots and pans may be run through dishwasher for sanitizing.

THE LONG AND SHORT OF IT: SQUARE FOOTAGE

AREA	MEALS SERVED PER DAY					
	200	200-400	400-600	600-800	800-1200	1200-1500
POT & PAN WASH.	75	75-85	85-100	100-110	110-125	125-150

- Should have area to allow for parking of portable pot/pan racks.
- Should have "soiled" and "clean" areas to avoid cross contamination.
- Provide generous aisles to allow for portable equipment to be moved through the area.

THINGS TO THINK ABOUT

- This is not a "fun" area to work in, so colors should be chosen to be as cheerful as possible.

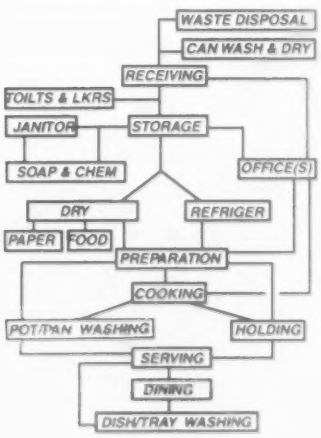
THE FINISH LINE

- This is a "wet" area so all materials should be selected with that in mind.
- Avoid materials that will rust or corrode. Stainless steel is usually less expensive over an extended period of time.
- Avoid materials that will not withstand constant abuse from grease, soaps, harsh chemicals, and extreme heat.
- Choices in order of preference are:

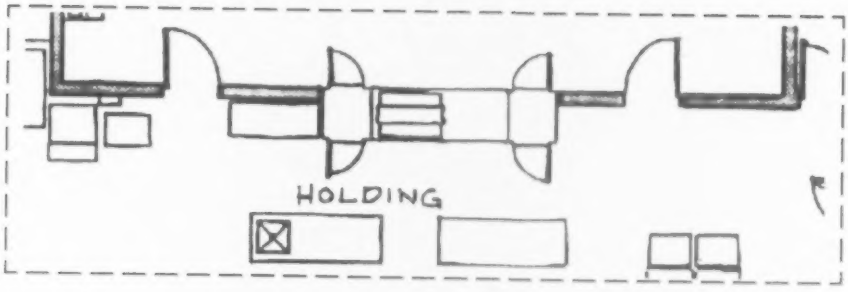
  Floor: Quarry tile, ceramic tile
  Base: Quarry tile, ceramic tile
  Walls: Ceramic tile, glazed brick/block, epoxy painted block
  Ceiling: Vinyl clad acoustical tile

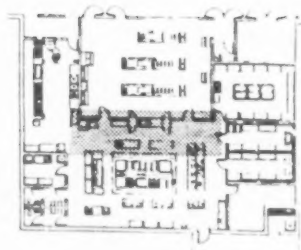
4-28

SPACE GUIDELINES

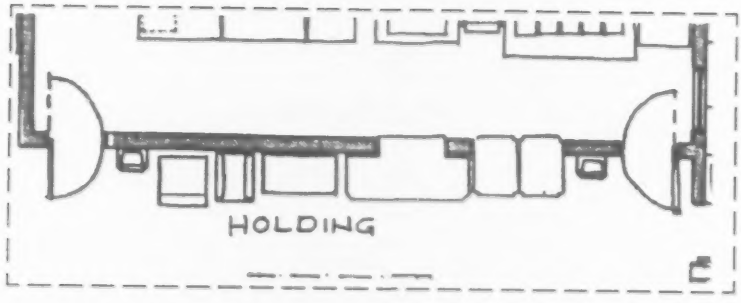


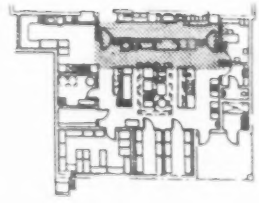
HOLDING





Holding is the area where food is kept hot or cold after preparation. Food on the serving line is replenished from this area.





HOLDING

THE BIG PICTURE: DESIGN OBJECTIVES

- The holding area should include provisions for holding foods refrigerated, non-refrigerated and heated. It should allow good visibility from cooking areas to serving lines so employees can easily see when food needs replenishing.

PROXIMITIES

- The food holding area should be between where the food has been cooked or prepared for serving and the serving area. It should be convenient to the serving counters in the serving area.
- Do not locate holding area adjacent to the student traffic flow in the serving area.

THE LONG AND SHORT OF IT: SQUARE FOOTAGE

AREA	MEALS SERVED PER DAY					
	200	200-400	400-600	600-800	800-1200	1200-1500
HOLDING & SERV.	250	250-400	400-800	800-1200	1200-1400	1400-1800

- Provide adequate space for employees to load and unload food from the holding equipment. This includes space in the kitchen and in the serving area.

THINGS TO THINK ABOUT

- A large wall opening should be provided to serving area so that food service personnel can easily see when and what food is in low supply on the serving lines.
- A pass-thru counter is convenient for returning empty serving pans to the kitchen.

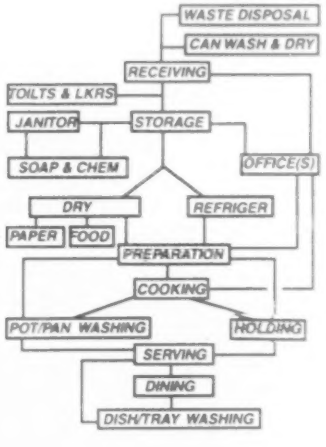
THE FINISH LINE

- Choices in order of preference are:

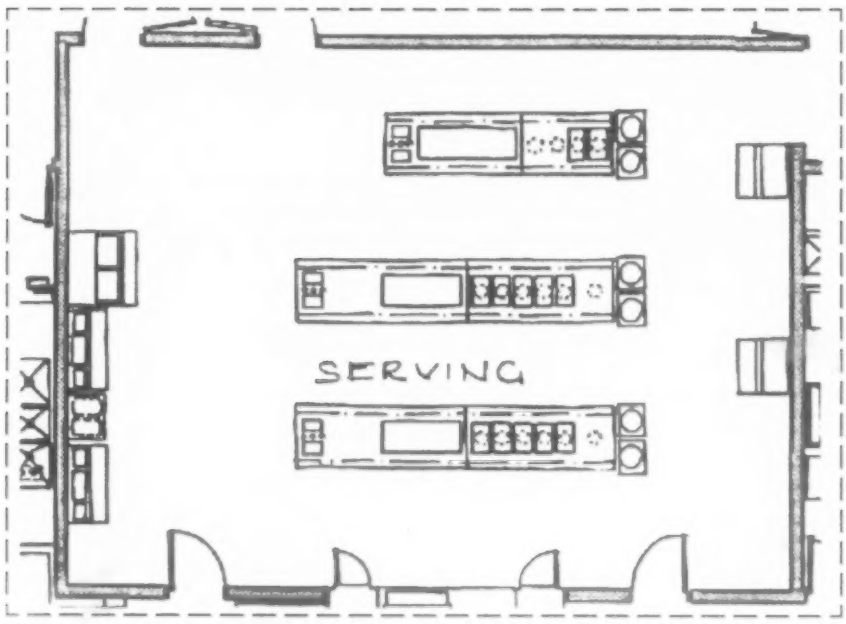
  Floor: Quarry tile, ceramic tile, sheet vinyl
  Base: Quarry tile, ceramic tile, vinyl
  Walls: Ceramic tile, glazed brick/block, epoxy painted block
  Ceiling: Vinyl clad acoustical tile (no open pores or voids)

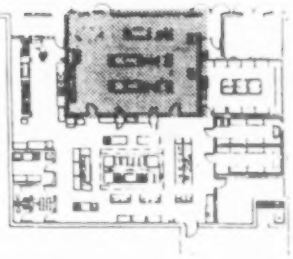
4-30

SPACE GUIDELINES



SERVING

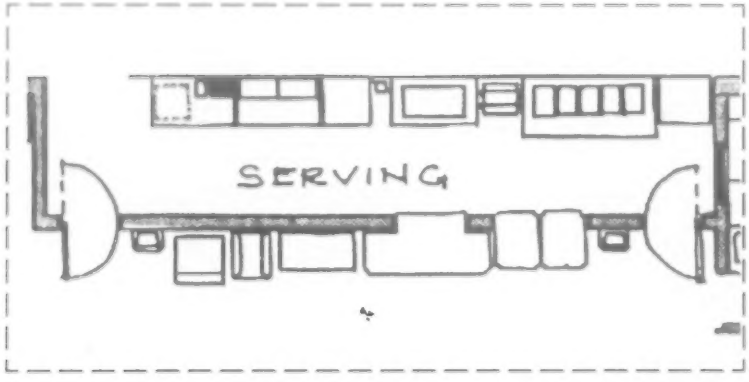


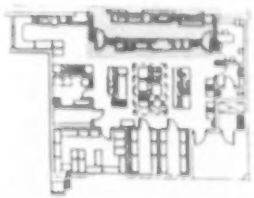


Serving is the space where food is served to the student.

It includes the following:

- *Display of both hot and cold offerings*
- *Space for cashiers*
- *Space for student flow*





THE BIG PICTURE: DESIGN OBJECTIVES

- The serving area should have a traffic flow which efficiently moves the students through the serving counter(s) and cashier(s) and into the dining room. The counter(s) should be arranged in the space so that serving personnel can also move freely through the students to replenish food from the holding equipment.

PROXIMITIES

- Serving area should be adjacent to kitchen and food holding areas.

THE LONG AND SHORT OF IT: SQUARE FOOTAGE

AREA	MEALS SERVED PER DAY					
	200	200-400	400-600	600-800	800-1200	1200-1500
HOLDING & SERV.	250	250-400	400-800	800-1200	1200-1400	1400-1800

- Provide adequate space for employees to unload food from the holding equipment.
- Provide adequate space for students to either queue-up or move freely through the space (type of serving system selected will dictate traffic flow). A "scramble" or "scatter" type system will require more square footage since students are not restricted to a line within the area.

3-13

THINGS TO THINK ABOUT

- A large opening in the wall at the holding area should be provided so that food service personnel can easily see when and what food needs replenishment on the serving lines.
- All aisles within the area should be a minimum of 36" wide.

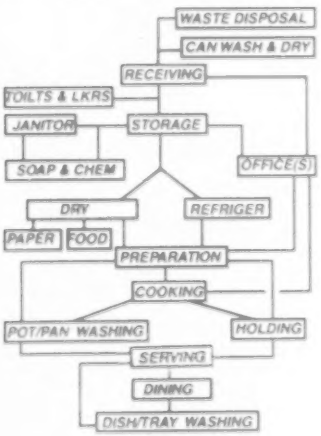
THE FINISH LINE

- Avoid materials that will not withstand constant abuse from students.
- Choices in order of preference are:

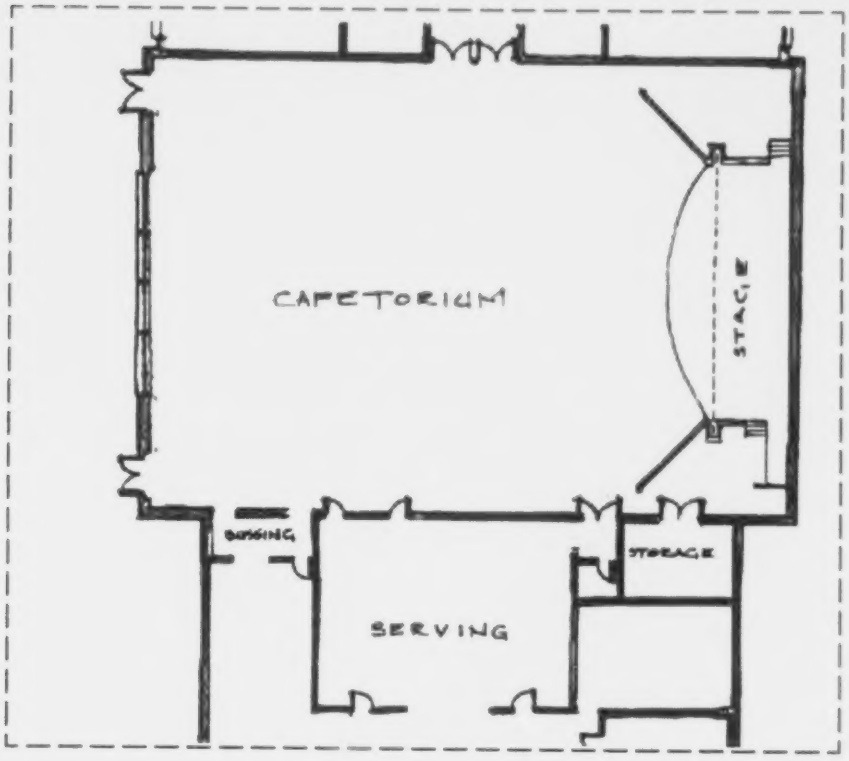
  Floor: Quarry tile, ceramic tile, sheet vinyl
  Base: Quarry tile, ceramic tile, vinyl
  Walls: Ceramic tile, glazed brick/block, epoxy painted block
  Ceiling: Vinyl clad acoustical tile (no open pores or voids)

4-32

SPACE GUIDELINES



DINING



Dining is the area provided for the consumption of food proceeding from the serving area to the eating area and including that eating area.

It may include the following:

- *Stage*
- *Multi-use space*

THE BIG PICTURE: DESIGN OBJECTIVES

- The dining area should be a comfortable inviting place for students to eat. Just as one would think of "atmosphere" in restaurant design, atmosphere should be considered in school dining design. Atmosphere is everything that affects people or makes some kind of impression on them and it can be determined by colors, room proportions, lighting, exterior views or lack thereof among many different things.
- Good atmosphere is an inducement for students to eat their lunch.

PROXIMITIES

- Dining should be adjacent to the dish/tray washing area, trash collection and serving areas.
- Entrance to serving area should be convenient to entrance to dining area.
- Separate serving from dining in some way.
- If possible, dish return area should not be directly exposed to dining area. It's not only loud, it's not very nice to look at while eating!

THE LONG AND SHORT OF IT: SQUARE FOOTAGE

AREA	*MEALS SERVED PER DAY*					
	200	*200-400*	*400-600*	*600-800*	*800-1200*	*1200-1500*
DINING	*800*	*800-1600*	*1600-2400*	*2400-3200*	*3200-3600*	*3600-4500*

- When planning this area, think of space in terms of freedom of movement rather than room dimensions in feet and inches.
- If dining room is intended for multi-purpose use, the other uses may change the recommended size of the area.

5-45

APPROXIMATE SQUARE FOOTAGE GUIDE BY TABLE TYPE

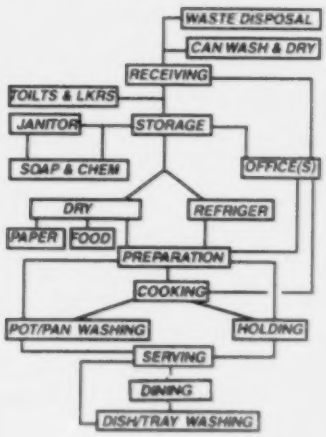
Grades	Rectangular Tables w/ Attached Seats	Rectangular Tables w/ Stacking Chairs	Round Tables w/ Stacking Chairs
K-6	8-10 s.f. per student	10-12 s.f. per student	11-14 s.f. per student
7-8	9-11	11-14	11-14
9-12	11	11-14	11-14

Source: Adapted from Equipment Guide for On-Site Kitchens. Washington, D.C.: U.S. Department of Agriculture, 1977.

- When planning space, allow sufficient square footage to meet the requirements of the Americans with Disabilities Act.

4-34

SPACE GUIDELINES



THINGS TO THINK ABOUT

- The students' perception of the dining room affects the way they feel and behave - and thus affects if and what they eat.
- Open and differentiated areas are suggested for large dining areas serving over 500 students. This breaks up the space to a more friendly scale and avoids an institutional look.
- The line to return dirty dishes should not cross serving line traffic.
- Placing garbage cans in the dining area is not recommended -- it's not very appetizing and flatware can be easily lost when students empty their own trays.
- Provide display areas for menus, seasonal decorations, educational materials, or for exhibiting student art or other projects.
- Acoustics of a space this large is very important.

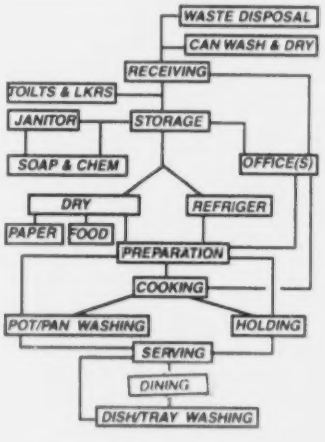
THE FINISH LINE

- Choices in order of preference are:

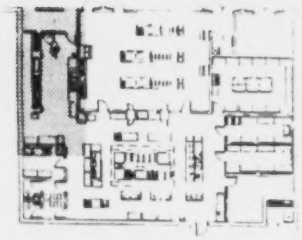
  Floor: Quarry tile, ceramic tile, terrazzo, sheet vinyl, VCT and limited use of carpet
  Base: Quarry tile, ceramic tile, vinyl (all coved)
  Walls: Ceramic tile, glazed brick/block, epoxy painted block, epoxy painted gypsum board
  Ceiling: Acoustical tile, gypsum board

TO SHED SOME LIGHT ON THE SUBJECT

- Natural lighting is very important in this space. Large areas of glass can be covered with blinds, drapes, or louvers/shutters.
- It is not recommended that windows be placed less than 1'-6" above the floor; abuse from students creates a possible hazard if they break.



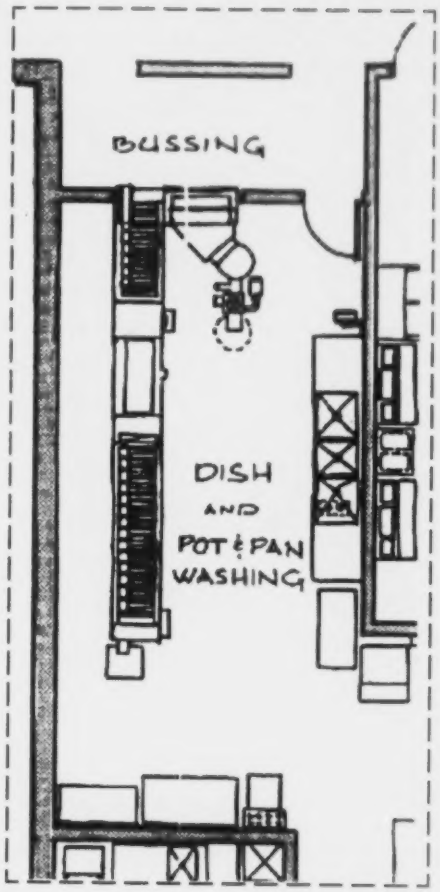
DISH/TRAY WASHING

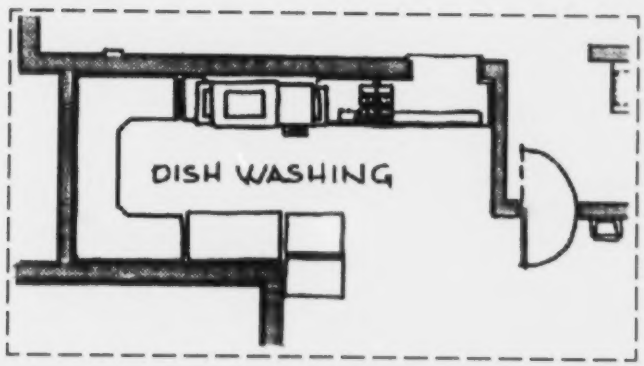


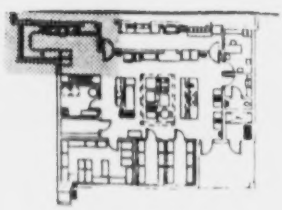
Dish/Tray Washing is space provided to wash, sterilize and dry dishes/trays/utensils used for the service and consumption of food.

It includes the following:

- *Dish/tray washing area*
- *Return for dishes/trays*
- *Trash disposal area*







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THE BIG PICTURE: DESIGN OBJECTIVES

- The dish/tray washing area should allow for a continous return of dishes/trays, efficient disposal of waste and ease in washing and returning clean items to use.

PROXIMITIES

- This area should be adjacent to the dining area and be so located near the dining exit so that the students can freely drop their dish/tray at a return window.
- Traffic flow is important. Locate the return window near the dining room exit without creating cross traffic with dining room entrance. Avoid interfering with students entering and leaving the serving area.
- Dish/tray washing should be out of the preparation and cooking areas and convenient to return dishes and trays to the kitchen and serving areas.

AREA	MEALS SERVED PER DAY					
	200	200-400	400-600	600-800	800-1200	1200-1500
DISH/TRAY WASH.	100	100-150	150-200	200-250	250-350	350-400

- Type and size of dishwasher will determine the size and shape of the dish/tray washing room.
- An area should be provided for the parking of portable dish/tray/flatware equipment.
- An area should be designated for flatware sorting.
- The exit of the dish/tray washing area should be located in the "clean" area so that clean items do not have to pass through the "soiled" area of the room.

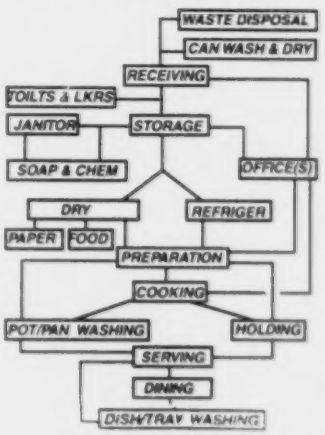
THINGS TO THINK ABOUT

- A dish return window should be located near the dining room exit and at the beginning of the soiled dish table. It should be a minimum of 36" wide to allow two students to use at the same time. The sill height of the window should be 1" higher than the dishtable to retain spillage from the dish table.

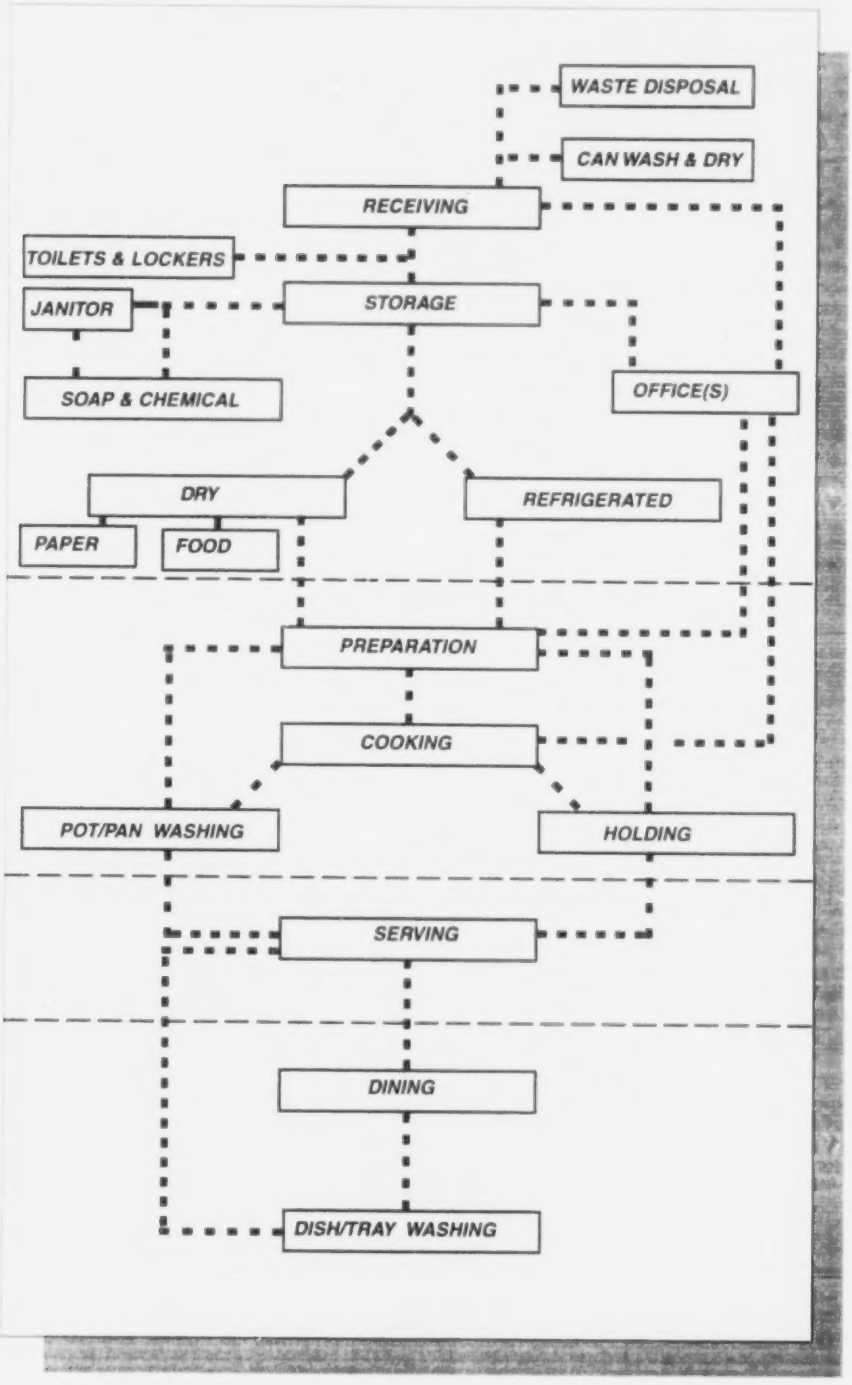
THE FINISH LINE

- This is not a "fun" area to work in so colors should be chosen to be cheerful.
- This is a very noisy and "wet" area so all materials should be selected with that in mind. All surfaces should withstand abuse from food, grease, soaps, harsh chemicals and exteme heat. Provide splash protection on the wall surface on the dining room side of the tray return window.
- Choices in order of preference are:

  Floor: Quarry tile, ceramic tile
  Base: Quarry tile, ceramic tile
  Walls: Ceramic tile, glazed brick/block, epoxy painted block
  Ceiling: Vinyl clad lay-in tile



FOOD SERVICE WORK FLOW & PROXIMITIES



See appendix for food service equipment templates for approximate layout and size of equipment for each of the food service areas shown on the chart above.

WHAT EQUIPMENT GOES INTO AN ON-SITE PREPARATION KITCHEN?

AREA	MEALS SERVED PER DAY					
	200	200-400	400-600	600-800	800-1200	1200-1500
CAN WASH						
HOT & COLD MIXING FAUCET	1	1	1	1	1	1
CAN DRYING RACKS (NON FERROUS)	1	1	1-2	2	2	3
RECEIVING						
RECEIVING TABLE WITH DRAWER	1	1	1 1	1	1	
RECEIVING SCALE	1	1	1	1	1	1
HAND SINK (DESIRABLE)	1	1	1	1	1	1
TOILETS AND LOCKERS						
(SEE INDIVIDUAL PAGES IN THIS CHAP)						
OFFICES						
(SEE INDIVIDUAL PAGES IN THIS CHAP)						
JANITOR/SOAP & CHEMICAL STORAGE						
4 SHELF SHELV'NG UNIT	18"-24"X36"	18"-24"X48"	18"-24"X54"	18"-24"X60"	18"-24"X72"	18"-24"X72"
JANITORS SINK	1	1	1	1	1	1
WASHER/DRYER (OPTIONAL)		1	1	1	1	1
DRY STORAGE						
4 SHELF SHELVING UNITS 18"-24" DEEP	25 L.F.	25-50 L.F.	50-75 L.F.	75-100 L.F.	100-150 L.F.	150-175 L.F.
CAN RACKS (OPTIONAL)	1	1	1-2	2	2	2
PORTABLE CARTS	1	1	1	2	2	2
DUNNAGE PLATFORMS	1	2	3	4	5	6
REFRIGERATED STORAGE						
WALK-IN COOLER (8'-6" HIGH DESIRE)	6'X8'	8'X8'	8'X12'	8'X16'	8'X20'	16'X20'
WALK-IN FREEZER (8'-6" HIGH DESIRE)	6'X8'	8'X8'	8'X12'	8'X16'	8'X20'	16'X20'
COOLER/FREEZER SHELVING	25 L.F.	25-50 L.F.	50-75 L.F.	75-100 L.F.	100-150 L.F.	150-175 L.F.
COOLER/FREEZER DUNNAGE RACKS	2	2	4	4	6	6
MOBILE ANGLE RACK (OPTIONAL)		1	1	2	2	3

Also reference NFSMI *Guidelines for Equipment to Prepare Healthy Meals* April 1996, Publication No. NFSMI-R-25-96 for equipment guidelines.

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WHAT EQUIPMENT GOES INTO AN ON-SITE PREPARATION KITCHEN?

AREA	MEALS SERVED PER DAY					
	200	200-400	400-600	600-800	800-1200	1200-1500
PREPARATION						
BAKERS TABLE WITH PORTABLE BINS	6'X30"	6'X30"	6'X30"	8'X30"	8'X30"	8'X30"
DISPOSER (OPTIONAL)	1 HP	1-2 HP	2 HP	2HP	2-3 HP	3 HP
DRINKING FOUNTAIN (DESIRABLE)	1	1	1	1	1	1
FOOD PROCESSOR	1	1	1	1	1	1-2
HAND SINKS	1 MIN.	1 MIN.	1 MIN.	2 MIN.	2 MIN.	2 MIN.
HEATER/PROOFER CABINET	1	1	1	1	1-2	2-3
MEAT SINK	1	1	1	1	1	1
MIXER	20 QT.	30 QT.	60 QT.	60 QT.	20&60 QT.	20&60 QT.
PORTABLE CARTS	1	2	3	4	5	6
POT/PAN SHELVING UNITS	1	1-2	2-3	3-4	4-5	5-6
PREPARATION TABLES	YES	YES	YES	YES	YES	YES
SLICER	1	1	1	1 AUTO	1 AUTO	1 AUTO
VEGETABLE SINK (2 COMPARTMENT)	1	1	1	1	1	1
VCM/HCM (CUTTER/MIXER)* (OPTIONAL)				1	1	1
WORK TABLES	YES	YES	YES	YES	YES	YES
COOKING						
COMBINATION OVEN/STEAMER** (OPT.)				1	1	1
CONVECTION OVEN **	1	1-2	2	2	2-3	4
CONVECTION STEAMER **	1	1	1	1	1	2
COOKS SINKS	1	1	1	1	1	2
COOLING RACKS	1	1	1-2	2	2-3	3-4
EXHST. HOOD (MAKE-UP AIR&FIRE PR.)	1	1	1	1	1	1
FRYER (OPTIONAL)	(1)+/-40LB.	(1)+/- 60LB.	(2)+/-60LB.	(2)+/-60LB.	(3)+/-60LB.	(3-4)+/-60LB.
FRYER FILTER (DESIRABLE)	1	1	1	1	1	1
RANGE (TWO BURNER)	1	1	1	1	1	1
TRUNNION KETTLES (BATCH COOKING)	(1) 5 GAL	(1) 10 GAL	(1-2) 10 GAL	(2) 10 GAL	(2) 10 GAL	(2) 10 GAL

* Only available in 3 phase service.

* * Convection ovens, convection steamers and combination oven/steamers may be used in combination. Therefore, total number of units should be taken into consideration.

WHAT EQUIPMENT GOES INTO AN ON-SITE PREPARATION KITCHEN?

AREA	MEALS SERVED PER DAY					
	200	200-400	400-600	600-800	800-1200	1200-1500
KETTLES (BULK COOKING)	20 GAL	20-30 GAL	30-40 GAL	20-40 GAL	(2) 40 GAL	(3) 40 GAL
TILTING SKILLET	30 GAL	30 GAL	30-40 GAL	40 GAL	40 GAL	40 GAL
POT/PAN WASHING						
3 COMPARTMENT SINK (DRAINBOARDS)	1	1	1	1	1	1
SINK SANITIZER	1	1	1	1	1	1
HAND SINK	1	1	1	1	1	1
HOLDING						
HEATED CABINET	20 CF	20 CF	20 CF	20 CF	20-40 CF	40 CF
REFRIGERATED CABINET	20 CF	20 CF	20 CF	20 CF	20-40 CF	40 CF
SERVING						
CASHIERS COUNTERS	1	1	1-2	2	2-3	4
ICE CREAM CABINET	1	1	1	1	1-2	1-2
MILK COOLERS	1	1	2	2	2-3	4
SERVING COUNTERS	1	1	2	2	2-3	3-4
SPECIALTY COUNTERS (OPTIONAL)	1	1	2	2	2-3	3-4
DISH/TRAY WASHING						
BOOSTER HEATER	1	1	1	1	1	1
CLEAN DISH TABLE (30" WIDE)	8 FT	8-10 FT	10-12 FT	12-14 FT	14 FT	14-16 FT
DISHWASHER (20"X20" RACKS PER HR)	50	50	200	200	270	270
DISPOSER (DESIRABLE)	2 HP	2 HP	3 HP	3 HP	3 HP	3-5 HP
HAND SINKS	1	1	1	1	1	
HOSE REEL (DESIRABLE)	1	1	1	1	1	1
PORTABLE CARTS	1	1	1-2	2	2-3	4
PRE-RINSE SINK WITH SPRAY	1	1	1	1	1	1
SILVER SORT TABLE			1	1	1	1
SOILED DISH TABLE (30"WIDE)	8 FT	8-10 FT	10-12 FT	12-14 FT	14 FT	14-16 FT

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GENERAL

Food service equipment shall be installed as follows:

- Counter-mounted equipment on 4" legs, sealed to counter, or portable.
- Floor-mounted equipment on 6" legs, casters, or sealed to floor.
- Equipment not on casters or not portable shall be sealed to the wall and/or adjoining equipment, or spaced to facilitate cleaning.
- Portable equipment and equipment installed on casters shall be installed with flexible utility lines and/or quick-disconnect couplings.

The above criteria shall be applied to permit all exposed areas of equipment and adjacent surfaces to be accessible for cleaning. If an item of equipment is not portable, is not installed on casters, or is not otherwise easily moved, it shall be (1) sealed to adjoining surfaces with an approved sealant or metal flashing, or (2) provided with sufficient space between and behind the equipment to allow easy access.

COUNTER AND UNDER-COUNTER INSTALLATION

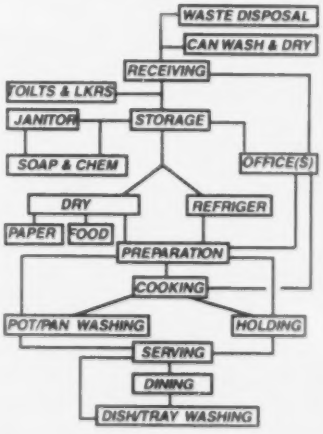
Food equipment which is not readily movable because of size, weight, or rigid utility connections shall be installed on counters or tables as follows:

- on 4" sanitary legs; or
- sealed to the counter; or
- properly spaced to facilitate cleaning; or
- equipped with an integral lift lever, pivoting foot, polyethylene wear strip, or a similar device which permits easy access under and around the equipment for cleaning.

Under-counter equipment not equipped with casters or sanitary skids shall be installed on 6" sanitary legs, sealed to adjacent surfaces, or properly spaced to facilitate cleaning.

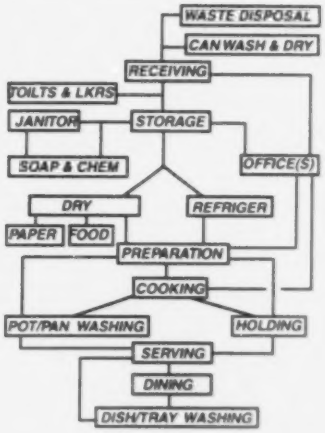
PORTABLE EQUIPMENT

Food equipment that is small and light enough to be easily moved by one person shall be considered portable and shall be exempt from these requirements.



SPACING REQUIREMENTS FOR FOOD EQUIPMENT

- Provided access is available from both ends of the equipment and the equipment length is 4' or less, the equipment shall be spaced at least 6" from walls.
- Provided access is available from both ends of the equipment and the equipment length is over 4' but less than 8', the equipment shall be spaced at least 12" from walls and other equipment.
- When the equipment length is 8' or more, the equipment shall be spaced at least 18" from walls and other equipment.
- A minimum of 6" of space shall be provided between items of equipment to allow access for cleaning. Additional space may be required for large equipment when 6" is not adequate to provide access.
- When the distance between the top of a walk-in cooler/freezer or canopy hood and the ceiling is 24" or less, an approved enclosure shall be required.
- Obstruction of the access opening between and/or behind equipment by a chase or rigid utility connection may require additional spacing.

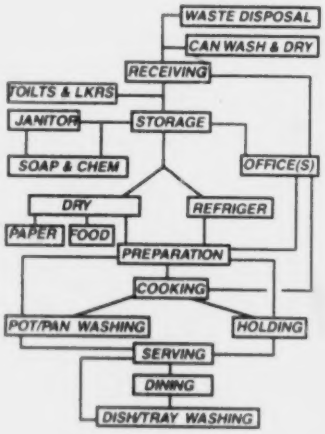


ELECTRICAL: POWER

- Coordinate electrical requirements for food service equipment with the food service specifier. The voltage, amperage and type of connection required should be noted. Equipment may be hard-wired directly to a junction box or may require a receptacle. If a receptacle is required it should be noted as to exactly what type of receptacle is needed. The mounting heights of receptacles and junction boxes should also be coordinated. Don't place a receptacle at 18" above finish floor (AFF) when the power feed is at the top of a 6'0" high piece of equipment.
- It is suggested that all utilities be in a separate closet. Kitchen staff should not have access to water heaters, electric panels, etc.

ELECTRICAL: LIGHTING

- When designing a lighting system for any task within the food service area it is important to consider not only lighting levels and energy efficiency but visual comfort as well. Visual comfort depends on many things such as glare, brightness, color rendition, light fixture placement, contrast and color of finishes.
- Incandescent lamps offer the best color rendering index (CRI), although there are fluorescent lamps on the market today that are very close to incandescent. Since incandescent is an extremely inefficient lamp source it is not recommended for general lighting.
- Fluorescent lamps are the most recommended and used in buildings of this type. Federal law will soon prohibit the manufacture of standard 40 watt fluorescent lamps.
- The use of T8 lamps and electronic ballast is increasingly common and recommended because of lower energy consumption when compared to standard energy saving lamps and ballast.
- Bulbs located over or within food storage areas, food preparation areas, food display areas, food service areas, equipment and utensil cleaning areas, equipment and utensil storage areas, and food equipment shall be shielded, coated or otherwise shatter-resistant. Shielded, coated, or otherwise shatter-resistant bulbs need not be used in areas used only for storing food in unopened packages, provided that the packages will not be affected by broken glass falling onto them and are capable of being cleaned of all debris prior to being opened. An infrared or other heat lamp shall be protected against breakage by a shield surrounding and extending beyond the bulb so that only the face of the bulb is exposed.

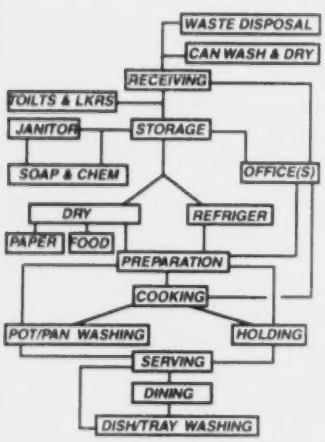


MECHANICAL

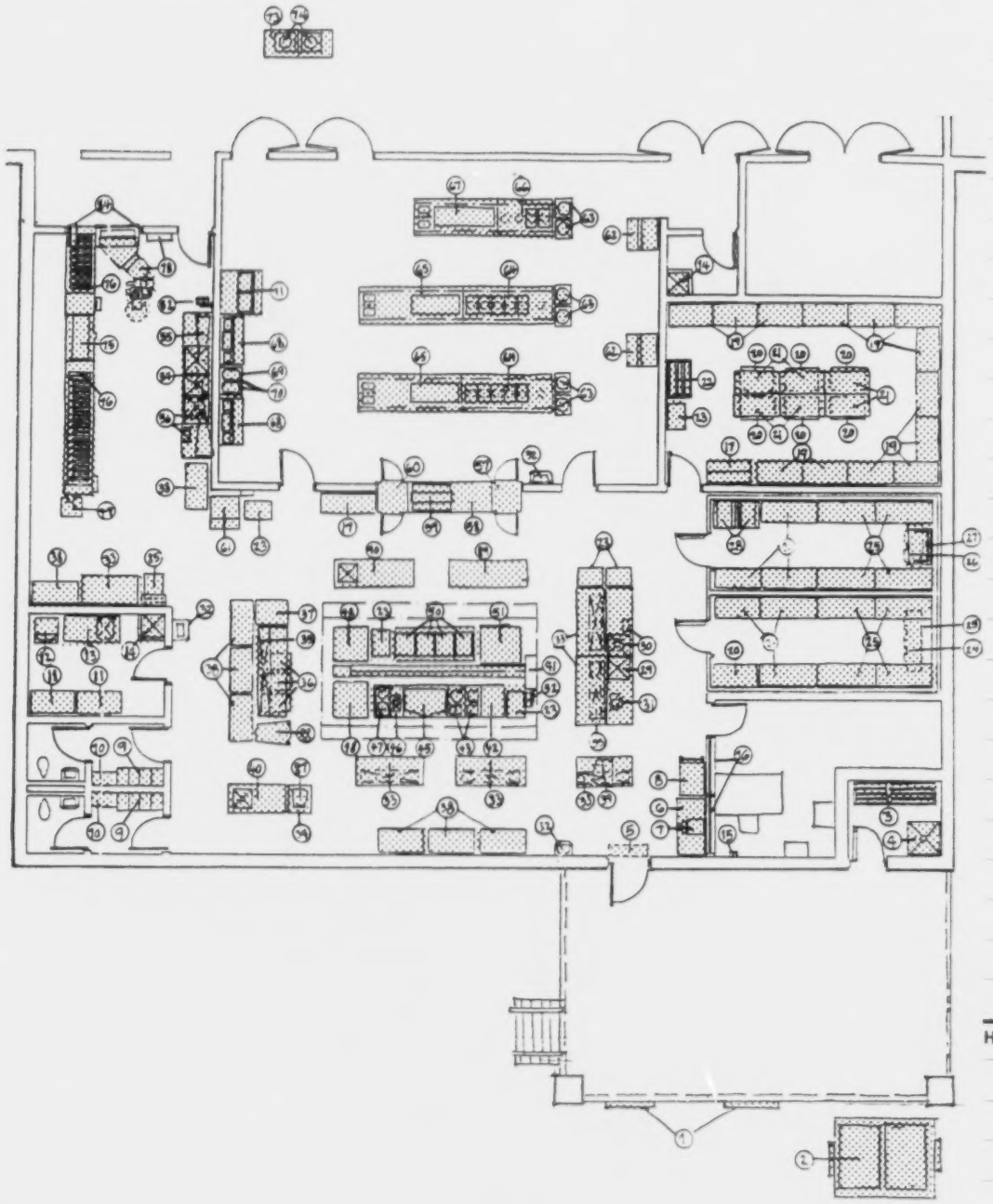
- A room should be provided for all electrical and mechanical equipment. This will minimize problems with code required clearances and moisture damaging equipment. Electrical and mechanical equipment should not be located in the same room.
- Dishwashing areas require large quantities of exhaust air. Generous use of exhaust hoods helps also. These are cost trade-offs.
- Coolers pull hot greasy air from kitchens. This shortens their life span. Any heat transfer surface (and all self-contained coolers have these) will build up a layer of grease/dirt/lint. This layer will shorten equipment life, increase operating cost and decrease performance if not cleaned regularly.

PLUMBING

- Generous use of floor drains is suggested due to the large quantities of water present in food service areas. Locate drains at food preparation, serving, holding and cooking areas. Drains are not recommended in dining areas. Make sure floors are graded to drains.
- Back-flow preventors are required on all domestic water service entrances to buildings. This is an issue that the plumbing engineer should address.
- Preferred location of water heater is close to the user. However, gas fired equipment requires air for combustion and a flue is needed.
- Drains in the loading dock area are very important, but they should be piped into the storm drain and not the kitchen sanitary drain.
- Hose bibs to wash down floors are definitely recommended along with tempering stations to provide hot water. (Any design that allows a wash down is recommended)



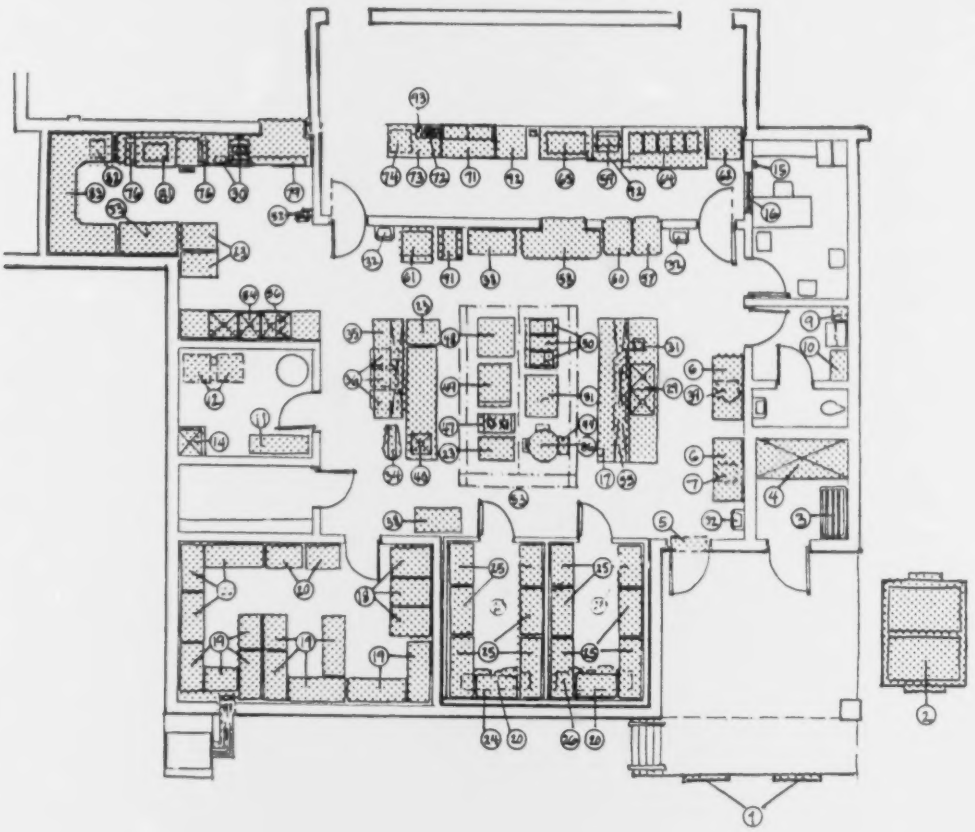
PROTOTYPE PLAN: FOOD SERVICE FOR 800-1200



Source: Plan provided by Henry Sprott Long & Associates, Architects and Roger Johnson, Food Service Consultant

Note: This plan is provided for reference purposes only. It is not considered a "perfect" or "model" plan and the National Food Service Management Institute does not endorse its use.

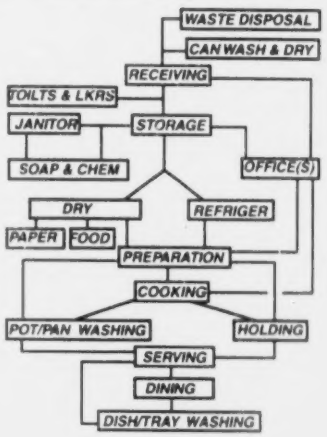
PROTOTYPE PLAN: FOOD SERVICE FOR 400-500

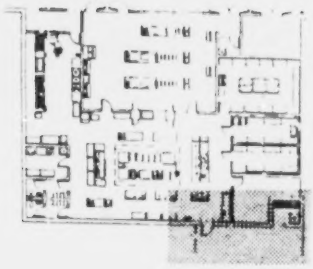


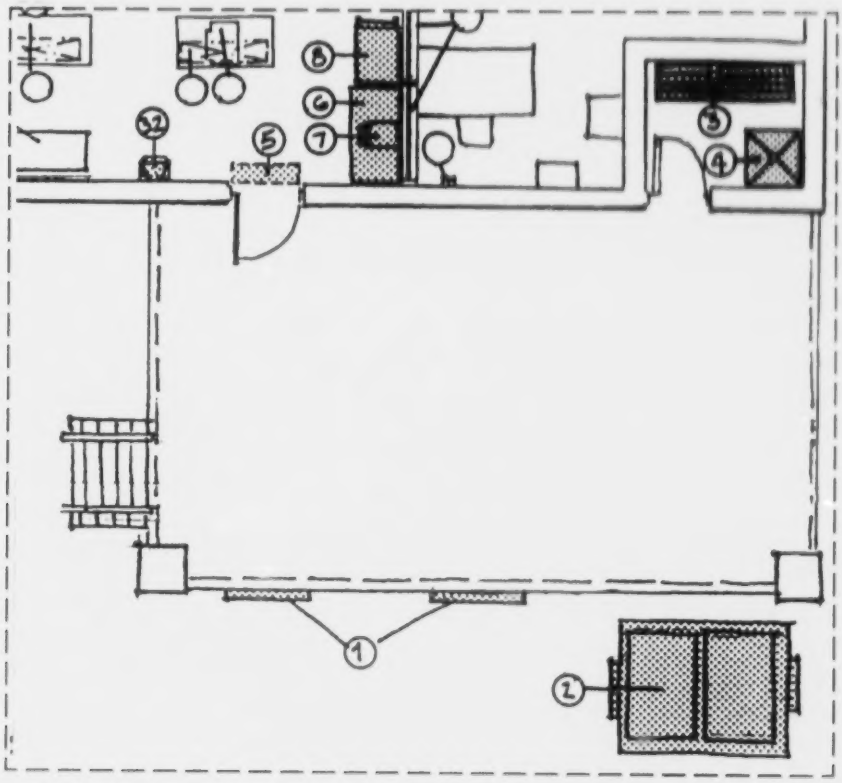
Source: Plan provided by Henry Sprott Long & Associates, Architects and Roger Johnson, Food Service Consultant.

Note: This plan is provided for reference purposes only. It is not considered a "perfect" or "model" plan and the National Food Service Management Institute does not endorse its use.

1. Truck Bumpers
2. Dumpster
3. Can Drying Rack
4. Floor Drain
5. Fly Fan
6. Mobile Table
7. Receiving Scale
8. Receiving Cart
9. Lockers
10. Benches
11. Soap and Chemical Shelves
12. Washer and Dryer
13. Laundry Counter with Sink
14. Mop Sink
15. Computer Outlet
16. Window
17. Work Counter
18. #10 Can Racks
19. Dry Storage Shelving Units
20. Mobile Dunnage Racks
21. Commodity Shelving Units
22. #10 Can Dispensing Rack
23. Utility Carts
24. Walk-in Freezer Blower Coil
25. Walk-in Shelving Units
26. Walk-in Cooler Blower Coil
27. Mobile Sack Cart
28. Universal Pan Racks
29. Vegetable Prep Table with Sinks
30. Disposer with Control Panel
31. Food Processor
32. Hand Sink
33. Mobile Work Table
34. Mixer
35. Baker's Table
36. Mobile Ingredient Bins
37. Heater/Proofer Cabinet
38. Mobile Pot and Pan Shelving Unit
39. Slicer
40. Prep Table with Sink
41. Utility Distribution System
42. Convection Steamer
43. Ten (10) Gallon Kettles
44. Drain Trough with Grate
45. Braising Pan
46. Spacer with Sink and Faucet
47. Two Burner Range
48. Double Deck Convection Oven
49. Fry Pan w/ Stand
50. Fryer with Filter
51. Combi Steamer/Convection Oven
52. Hose Reels
53. Ventilator with Fire Suppression
54. Pot and Pan Sink with Drainboards
55. Overshelf with Pot Rack Under
56. Sink Sanitizer
57. Pass Through Hot Cabinet
58. Pass Through Work Counter
59. Food Warmer
60. Pass Through Refrigerator
61. Ice Maker and Storage Bin
62. Milk Coolers
63. Mobile Tray Dispensers
64. Hot Food Counter
65. Cold Food Counter
66. Counter with Two Hot Wells
67. Salad Bar
68. Condiment Counter
69. Tea Rack
70. Tea Dispensers
71. Ice Cream Cabinet
72. Silver Cylinder Holder
73. Cashier's Stand
74. Cash Register
75. Self Bussing Conveyor Dishwasher
76. Stainless Steel Ducts
77. Silver Cart
78. Pulper/Extractor with Feed Trough
79. Soiled Dishtable
80. Pre-Rinse Spray
81. Dishwasher with Pre-Wash
82. Booster Heater
83. Clean Dishtable
84. Stainless Steel Frame
85. Mobile Silver Sort Cart
86. Kettle
87. Mixer Stand
88. Mixer
89. Landing Table
90. Landing Table w/ Sink
91. Mobile Utility Rack
92. Solid Top Counter
93. Napkin Dispenser

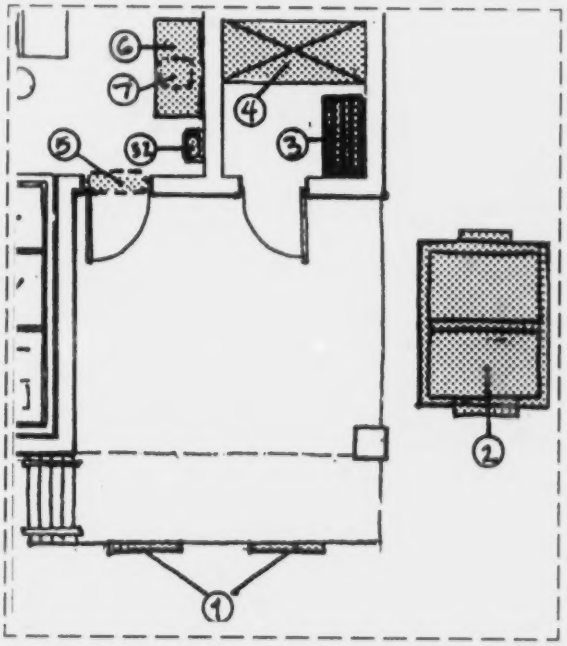


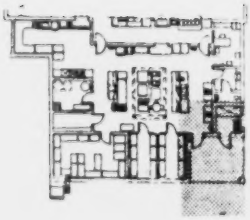




Equipment in the ***Receiving & Waste Disposal*** *area includes following:*

1. *Truck Bumpers*
2. *Dumpster*
3. *Can Drying Rack*
4. *Floor Drain*
5. *Fly Fan*
6. *Mobile Table*
7. *Receiving Scale*
8. *Receiving Cart*
32. *Hand Sink*





WHAT FOOD SERVICE EQUIPMENT GOES HERE?

AREA	MEALS SERVED PER DAY					
	200	200-400	400-600	600-800	800-1200	1200-1500
CAN WASH						
HOT/COLD MIX FAUCET	1	1	1	1	1	1
CAN DRYING RACKS	1	1	1-2	2	2	3
RECEIVING						
REC. TABLE W/DRAWER	1	1	1	1	1	1
RECEIVING SCALE	1	1	1	1	1	1
HAND SINK (DES.)	1	1	1	1	1	1

- In the can washing area, the can drying rack should be 12" above the floor to allow for air circulation. Rack should be non-ferrous material to avoid rusting.
- Receiving scale should be located in the interior receiving space.
- A receiving table or desk is useful for signing paperwork.
- A hand sink should be nearby for clean-up after deliveries and can washing.

THINGS TO THINK ABOUT

- A location should be established for a grease disposal container that will be emptied by an outside contracted firm. Remember that vermin are attracted to grease containers so location should be selected carefully.
- Door thresholds should be as low as possible to allow hand trucks and carts to roll over them easily.

ELECTRICAL: POWER

- This is generally NOT a good location for electrical panels as items can be stored in front of them and make them inaccessible.
- Provide convenience outlets in this area.
- Provide power to HVAC equipment, air curtains and other equipment in this area.

ELECTRICAL: LIGHTING

- Recommended light level is 50 foot candles.
- The lighting in this area should be easily maintained and energy efficient with a long lamp life, such as fluorescent.
- Light fixtures should be gasketed to seal the fixture from moisture from room washdown and cleaning.

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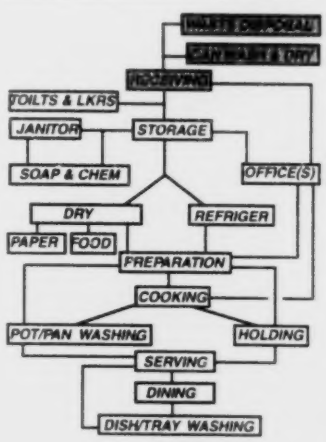


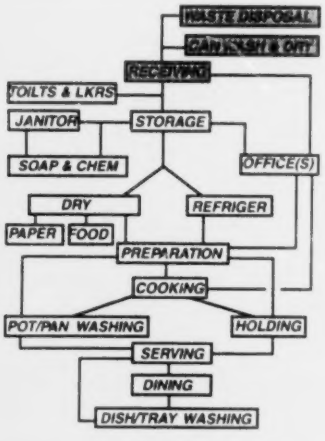
- An energy efficient, vandal resistant light fixture should be located outside the receiving area door to assist in early morning or late night deliveries. A switch located inside near the door could be used to control the light so that it does not have to stay on all night. If the light should stay on during the night for security reasons, it should be controlled with a photo cell.

MECHANICAL

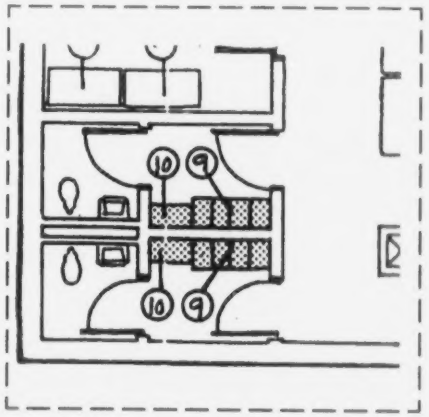
- Provide an air curtain at the receiving entrance door for insect control.

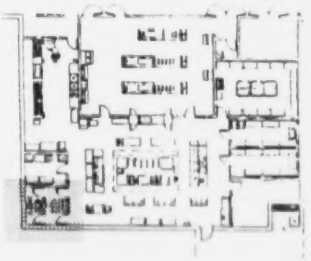
PLUMBING

- Provide can washing area with hot and cold water supply and a drain for clean-up.
- Dumpster pad should be provided with water supply and drain for clean-up.
- Garbage disposals cannot be connected to septic tank systems; waste pulpers have special requirements when connected to septic tank systems. Contact the local county health department for assistance and clarification.



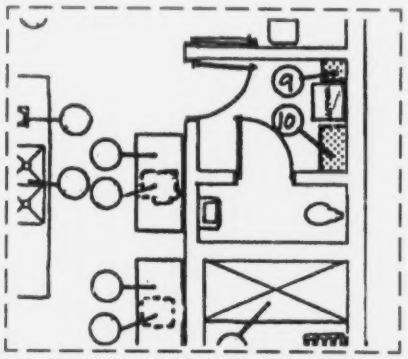
TOILETS AND LOCKERS

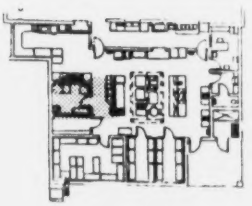




Equipment in the ***Toilets and Lockers*** *area includes following:*

9. *Lockers*
10. *Benches*





TOILETS AND LOCKERS

WHAT FOOD SERVICE EQUIPMENT GOES HERE?

- The toilet areas should have toilets, lavatories, soap dispensers, towel dispensers or hot air blowers and mirrors.
- The employee locker area should be provided with lockers which are 72" high by approximately 15" wide for each employee. Lockers should have locks or provisions for padlocks. A bench and coat rack should be provided as well. A bulletin board and first aid cabinet may be provided here or they may be provided outside the manager's office.

THINGS TO THINK ABOUT

- The equipment in this area must comply with the Americans with Disabilities Act.

ELECTRICAL : POWER

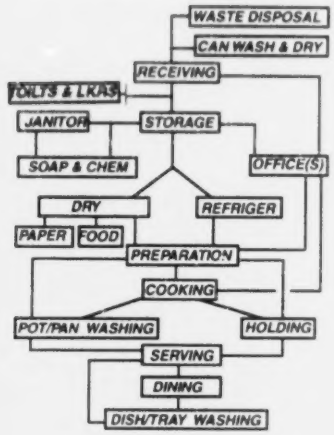
- Provide power connections to toilet accessories such as hand blowers.
- Provide convenience receptacles in the toilet area and locker area.

ELECTRICAL: LIGHTING

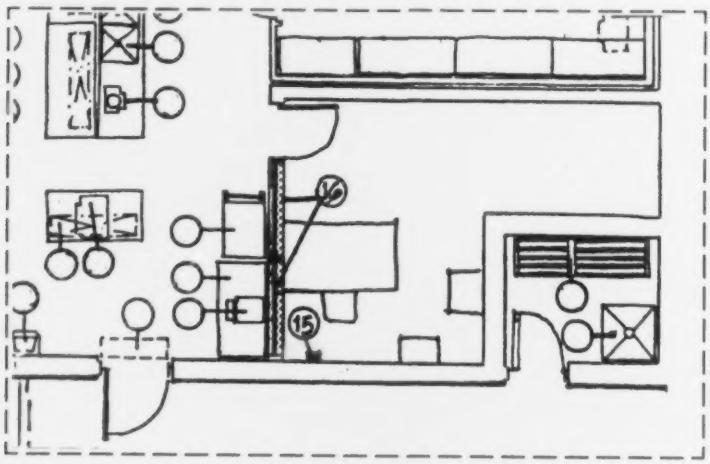
- The type of lighting should be similar to what is used in the kitchen and serving area.
- Lights should be controlled with a separate switch located in these areas.

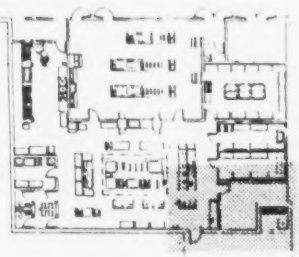
PLUMBING

- Provide plumbing connections to fixtures that may be located in this area.



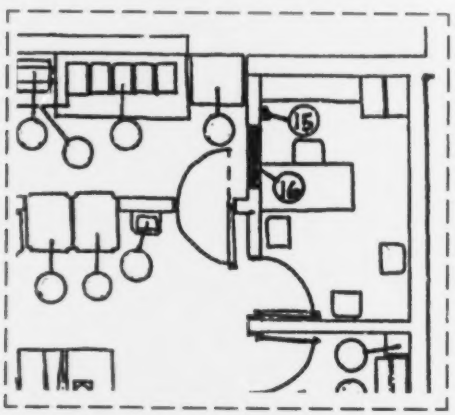
OFFICE(S)

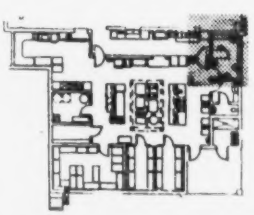




Equipment in the office includes following:

15. Computer Outlet
16. Window with view to food preparation area
Other equipment as needed by SFS manager





OFFICE(S)

WHAT FOOD SERVICE EQUIPMENT GOES HERE?

- The equipment and furniture that goes in this area will vary from school to school. In general, the school food service manager will need a desk, chairs, bookcases, locking file cabinets, computer table or desk with printer stand and typewriter stand.
- All offices should have a dedicated computer line. If a computer isn't used at the present time, conduit can be run to allow for future installation of computer lines.

THINGS TO THINK ABOUT

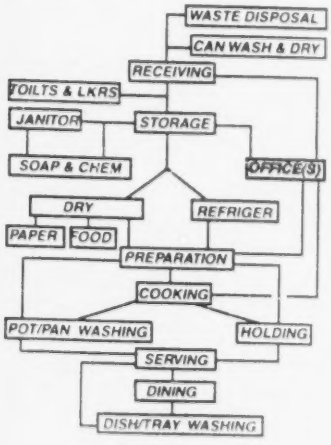
- Think toward the future. The school food service managers will become more and more dependent on computer equipment to do their job efficiently. This means providing adequate wiring and space to allow this to happen easily.

ELECTRICAL : POWER

- Provide plenty of convenience receptacles in this area for office equipment.
- Provide receptacles for computer equipment as necessary.

ELECTRICAL: LIGHTING

- The type of lighting should be similar to what is used in the kitchen and serving area.
- Lights may be controlled with a separate switch located in this area or they may be controlled with kitchen lights.



SHELVING CONSIDERATIONS

When selecting a shelving system, it should be made up of **shelving units**. A shelving unit is four upright supporting posts and a number of shelves. Shelving should be part of the equipment and not a part of the architectural millwork in the specifications and contract drawings.

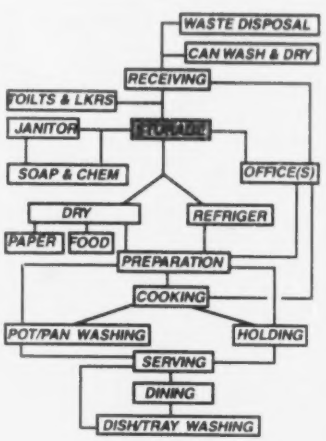
Always be sure to consider the following:

- Must be NSF approved!
- The shelves should be adjustable. Storage needs change and the shelving should be able to adapt to that change.
- Shelving should be in lengths no longer than 60" without supporting posts. In most cases, shelving that is longer than 60" will tend to fatigue and sag over time due to the loads.
- Most manufacturers of shelving units will have available a "clip" which will allow you to eliminate two posts on each shelving unit. This is an acceptable method of support when the posts are an obstruction or when price is the primary consideration. "Clips" should be considered carefully since relocation of the shelving unit is impossible without purchasing two additional posts. In most cases, "clips" do not affect the load bearing capacity of the shelf.
- Determine where the shelving will be used and what category of products will be stored there. This will dictate the type of material the shelving should be. Example: Harsh corrosive chemicals will require a different type of shelf material than paper storage.
- Determine what weight loads will be placed on the shelving. Most shelving will support approximately 600 to 800 pounds per shelf. If loads are to exceed that, it may be that heavy duty shelving will be required. Most manufacturers have both standard and heavy duty type shelving.
- When selecting shelf types, remember that different types of shelves can be placed within the same shelving unit.

SHELVING MATERIALS

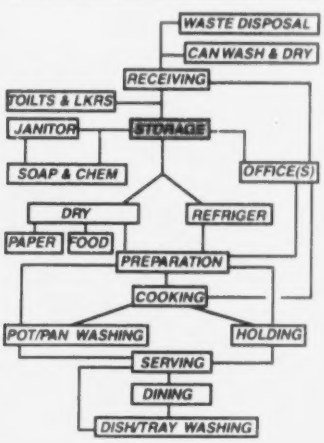
Below we have listed the various materials available in shelving construction and their advantages and disadvantages.

- **Stainless Steel**
    - Most expensive of all materials available for shelving (very expensive).
    - Excellent for use in high humidity areas.
    - Most durable finish since it has no plating or coating.
    - Chemical resistant material.
    - Will not rust or corrode.
    - Will clean easily



STORAGE: GENERAL NOTES ON SHELVING

- **Chrome Plated**
  - Provides a bright metallic finish.
  - Limited corrosion and rust protection.
  - More durable than zinc plating.
  - Should not be used in high humidity areas such as walk-in coolers, freezers, or dish rooms.
- **Zinc Plated**
  - Provides a bright metallic finish.
  - Limited corrosion and rust protection.
  - Most cost effective plating.
  - Should not be used in high humidity areas such as walk-in coolers, freezers, or dish rooms.
  - Usually the best finish for dry storage (not chemicals).
- **Epoxy Coated**
  - Epoxy coating should be on a plated shelf.
  - Good for use in high humidity areas.
  - Epoxy coated shelving usually carries and extended manufacturer's warranty against corrosion and rust.
- **Polymer (plastic)**
  - Will not rust or corrode.
  - Excellent for use in high humidity areas.
  - Will clean easily.
  - Available in many weight bearing capacities.
  - Chemical resistant material.
- **Aluminum**
  - Lightweight
  - Usually inexpensive.
  - Finish will oxidize and "rub off" on the product stored.
  - Not chemical resistant.
- **Galvanized**
  - Should never be used.
- **Painted Galvanized**
  - Should never be used.
- **Wood**
  - NEVER consider wooden shelves as a possiblity.
  - Difficult to clean and sanitize.
  - Will damage easily and thus become unsanitary and dangerous. Splinters become lodged in boxes and, worse of all, your fingers.
  - Is fixed in position and cannot be adjusted for different size products.
  - Will eventually rot where in contact with the floor due to the constant exposure to floor cleaning.
  - Will not be acceptable by most health inspectors!



TYPES OF SHELVING AVAILABLE

Uprights (posts): These are available in many configurations such as round, square, angle, etc. The important thing to consider is how the shelf is attached to the post.

Set-Screw: This method will require special tools and is difficult and time consuming to assemble. Set-screws can become loose after a period of time and the shelves could slip from position. This could become very dangerous if someone's hands are under the shelf when the shelf falls!

Nut & Bolt: This method will require special tools and is difficult and time consuming to assemble. The nut & bolt configuration is very difficult (if not impossible) to clean.

Post Clips: This method is where a metal or plastic sleeve attaches the shelf to the post. There are no special tools required and assembly is easy. Post clips are available in a variety of configurations depending upon the manufacturer. This method is usually the best since shelves can be moved easily.

Shelves: These are also available in many styles and materials.

Wire (stainless steel, zinc plated, chrome plated, epoxy coated): Shelves are constructed of heavy gauge wire welded to perimeter frame. These allow excellent air flow between shelves and effective water penetration between shelves when in an area with a building fire sprinkler system. Wire construction prevents dust accumulation on shelves, good visibility of stored items and good penetration of light.

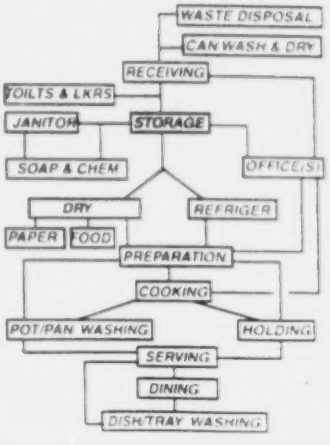
Slatted (stainless steel, polymer, aluminum, galvanized, painted galvanized): Shelves are constructed of a series of tubes or bars attached to a perimeter frame. Some are in an open "grid" pattern. Slatted or louvered shelves are available in many configurations depending upon the manufacture. These shelves offer some of the advantages of both wire and solid shelves. They allow excellent air flow between shelves and prevent dust accumulation. The slats allow effective water penetration between shelves when in an area with a building fire sprinkler system and they provide good visibility of stored items and good penetration of light.

Solid (stainless steel, polymer, aluminum, galvanized, painted galvanized): Shelves are constructed of a solid material. Some manufacturers have solid mats or covers that cover a wire shelf. Spills will not penetrate between shelves and small items can be stored easily without "tipping over." A solid top shelf unit will keep dust from falling through to the lower shelves.

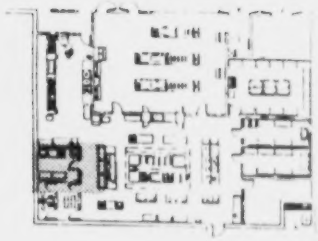
SHELVING OPTIONS

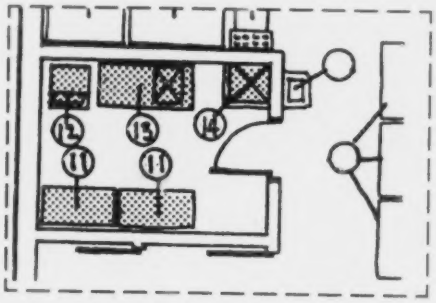
There are many options and accessories that are available to make your storage "system" more efficient. Some of these are items such as casters, can racks, bin markers, shelf dividers, pan racks, dunnage racks, pallettes, etc. Of all these, you should explore the possible advantage of mobility provided by casters.

When selecting shelving, keep in mind you are buying a "storage system." The purpose of shelving is to maximize your storage space!



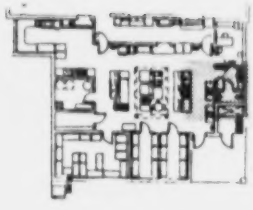
STORAGE: SOAP AND CHEMICAL/JANITOR

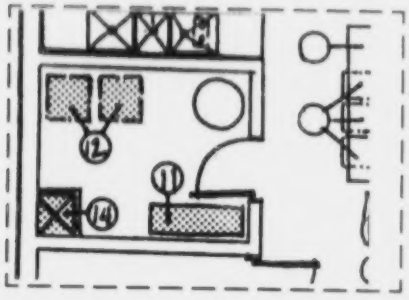




Equipment in the ***Soap and Chemical Storage/Janitor*** *area includes following:*

11. Soap and Chemical Rack
12. Washer/Dryer
13. Laundry Counter with Sink
14. Mop Sink





STORAGE:SOAP AND CHEMICAL/JANITOR

WHAT FOOD SERVICE EQUIPMENT GOES HERE?

AREA	MEALS SERVED PER DAY					
	200	200-400	400-600	600-800	800-1200	1200-1500
JAN./SOAP & CHEM. STOR.						
4 SHELF SHELVING UNIT	18"-24"X36"	18"-24"X48"	18"-24"X54"	18"-24"X60"	18"-24"X72"	18"-24"X72"
JANITOR'S SINK	1	1	1	1	1	1
WASHER/DRYER (OPT)		1	1	1	1	1

- Soap and Chemical storage shelving should be cleanable, 6" off floor minimum, chemical-proof or non-corrosive material, solid shelves and sized according to buying habits of food service director.
- Paper goods storage shelving should be cleanable, 6" off floor minimum, sized according to buying habits of food service director, adjustable shelves and locking casters to allow for easy moving.
- A mop rack should be provided in this room.

THINGS TO THINK ABOUT

- Paper goods may be stored with dry food storage.

ELECTRICAL: POWER

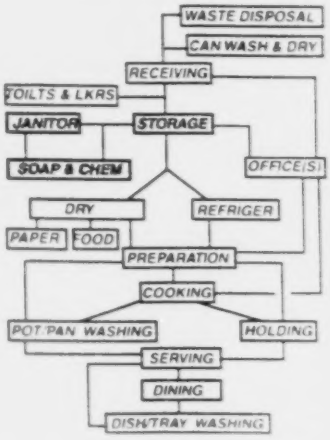
- It is generally a good idea to provide at least one convenience outlet in every storage room.
- DO NOT locate electrical panels in storage rooms since items may be stored in front of them and make them inaccessible. This is an electrical code violation.

ELECTRICAL: LIGHTING

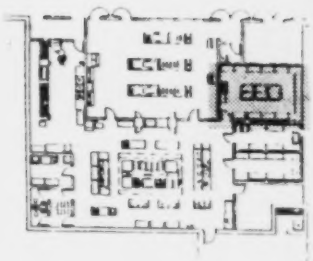
- Recommended lighting level is 30 footcandles depending on the amount of activity. For storage rooms with small items or high activity the light level could be as high as 50 footcandles.
- An energy efficient, easily maintained fixture, such as fluorescent, should be used. A switch located in the room should be used to control the light.

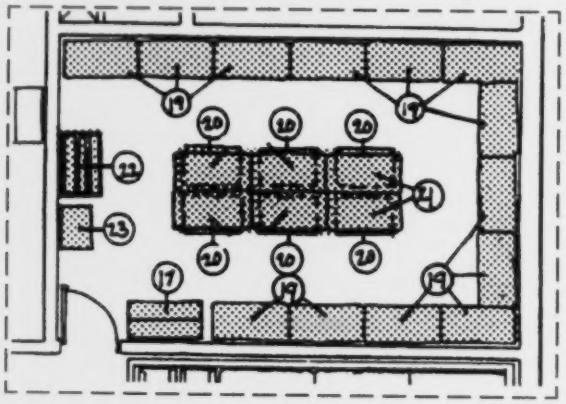
MECHANICAL

- Provide heating and ventilation only; 2-3 air changes per hour.
- No outside air is required during heating season unless occupied.
- Outside ventilation air should be used for room temperature control during spring, summer and autumn.
- Unit type - gas fired or electric heating/ventilating unit. Roof mounted; minimum duct work.



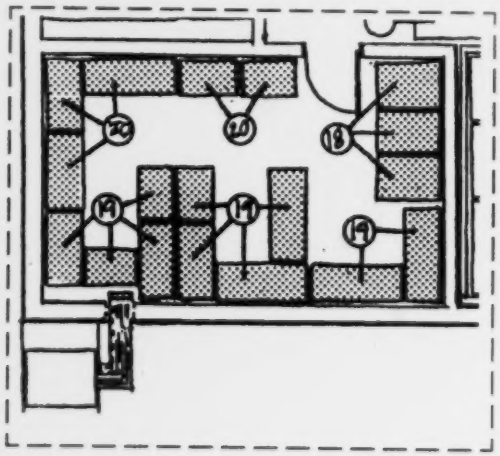
STORAGE: DRY FOOD AND PAPER GOODS

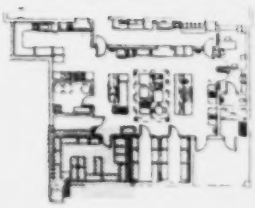




Equipment in ***Dry Food Storage*** *includes following:*

17. Work Center
18. # 10 Can Racks
19. Dry Storage Shelving Units
20. Mobile Dunnage Racks
22. # 10 Can Dispensing Rack
23. Utility Carts





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STORAGE: DRY FOOD

WHAT FOOD SERVICE EQUIPMENT GOES HERE?

AREA	MEALS SERVED PER DAY					
	200	200-400	400-600	600-800	800-1200	1200-1500
DRY STORAGE						
4 SHELF UNIT 18"-24"WIDE	25 L.F.	25-50 L.F.	50-75 L.F.	75-100 L.F.	100-150 L.F.	150-175 L.F.
CAN RACKS (OPT.)	1	1	1-2	2	2	2
PORTABLE CARTS	1	1	1	2	2	2
DUNNAGE PLATFORMS	1	2	3	4	5	6

- Storage shelving should be approximately 74" in overall height to avoid the use of ladders or stools. Most cartons will be for #10 cans (19" x 12-3/4" x 6-1/2" high) thus a 21" deep shelf is ideal. Each unit would have four (4) shelves. The bottom shelf should be 6" off the floor for easy cleaning. The next two shelves should be spaced at 26" and the top shelf at 74" above the floor. This arrangement will allow the stacking of three cases of #10 cans on the bottom two shelves and two cases on the bottom two shelves and two cases on the third shelf. The top shelf should be reserved for lightweight items such as paper goods.
- Dunnage platforms should be 6" off floor minimum with locking casters to allow for easy moving to receiving area.
- Supply heavy duty platforms for large loads.

THINGS TO THINK ABOUT

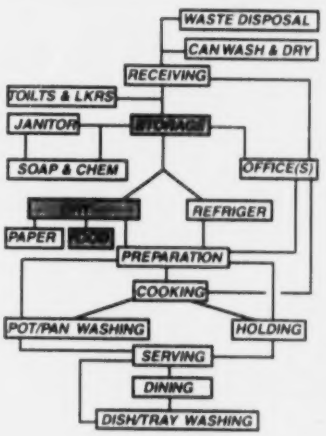
- A sprinkler system may be installed here as an extra measure of protection.
- Shelves should be adjustable and have locking casters for easy moving.

ELECTRICAL: POWER

- DO NOT locate electrical panels in storage rooms since items may be stored in front of them and make them inaccessible. This is an electrical code violation.
- Provide at least one convenience outlet in all storage rooms.

ELECTRICAL: LIGHTING

- Recommended light level in this area is 30 footcandles.
- The lighting should be energy efficient and easily maintainable, usually fluorescent.
- Light fixtures should not extend below 8'-0" so as not to interfere with shelving and stored items.



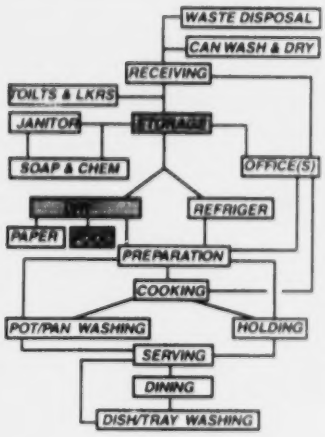
- A switch should be located in the room to control the lights.

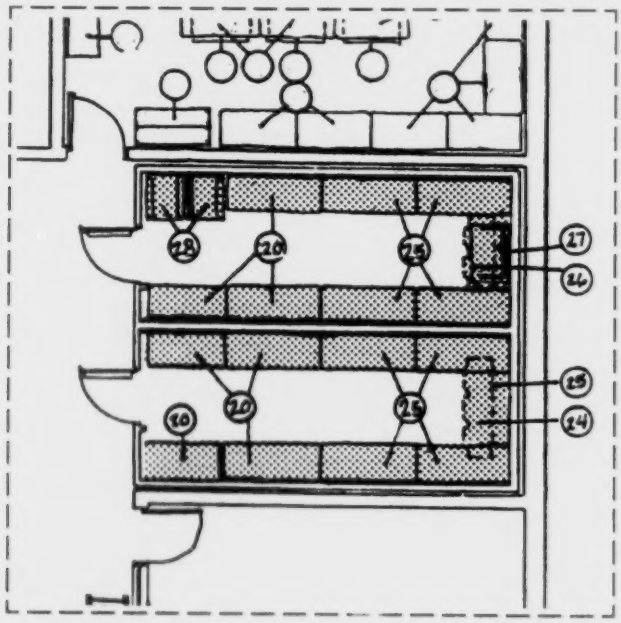
MECHANICAL

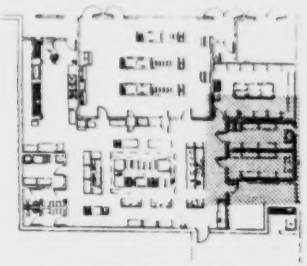
- Heating and air conditioning should be provided at approximately 3-4 air changes per hour.
- No outside air is required unless occupied by people.
- Outside ventilation air should be used for room temperature control when feasible.
- This space is conditioned for the purpose of extending product shelf life. If budgets will not allow conditioning use the same guidelines as non-food storage.

PLUMBING

- DO NOT place hot water heater in dry storage room. Provide a seperate room or closet for plumbing equipment. Gas fired water heaters require a combustion air duct or opening to outdoors.

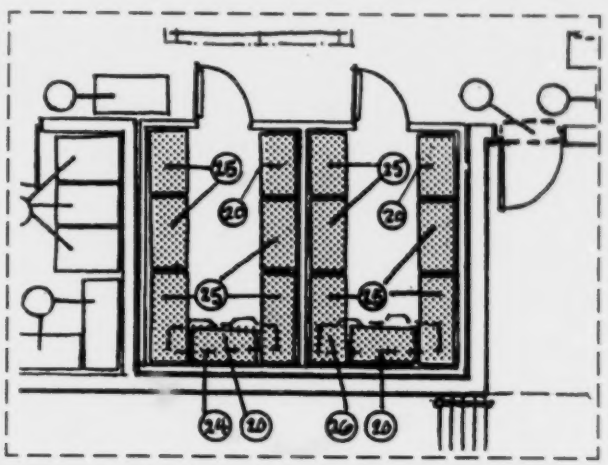


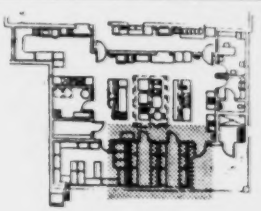




Equipment in ***Refrigerated Storage*** *includes the following:*

20. Mobile Dunnage Racks
24. Walk-in Freezer Blower Coil
25. Walk-in Shelving Units
26. Walk-in Cooler Blower Coil
27. Mobile Sack Cart
28. Universal Pan Racks





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STORAGE: REFRIGERATED

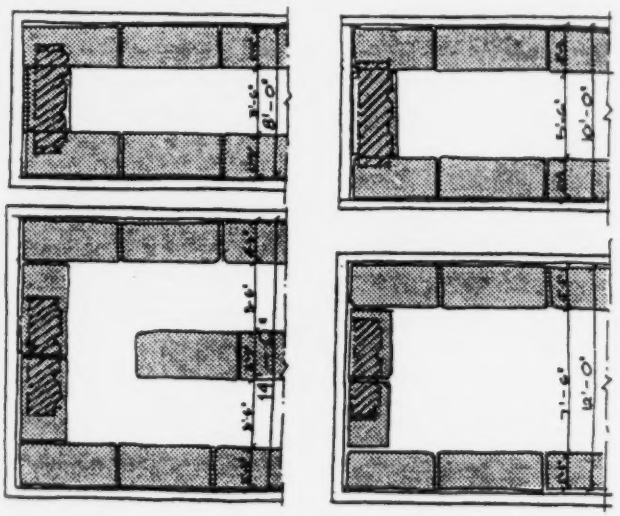
WHAT FOOD SERVICE EQUIPMENT GOES HERE?

AREA	MEALS SERVED PER DAY					
	200	200-400	400-600	600-800	800-1200	1200-1500
REFRIGERATED STORAGE						
WALK-IN COOLER	6'X8'	8'X8'	8'X12'	8'X16'	8'X20'	16'X20'
WALK-IN FREEZER	6'X8'	8'X8'	8'X12'	8'X16'	8'X20'	16'X20'
COOL/FREEZ SHELV.	25 L.F.	25-50 L.F.	50-75 L.F.	75-100 L.F.	100-150 L.F.	150-175 L.F.
COOL/FREEZ. RACKS	2	2	4	4	6	6
MOBILE ANGLE RACK (OPT)		1	1	2	2	3

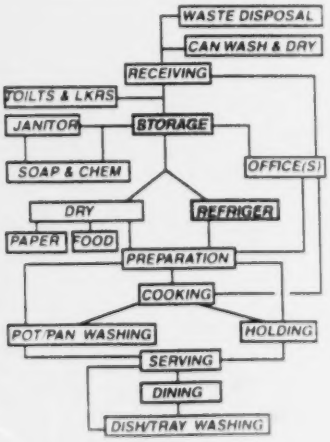
- Walk-in coolers and freezers are most desirable. Suggested height is 8'-6".
- Shelving should be approximately 60" in overall height to avoid the use of ladders (4 shelves spaced at 18" with bottom shelf 6" off the floor = 60"). Shelves should have locking casters and should be adjustable. Slatted polymer or epoxy coated wire shelves should be specified to avoid corrosion and allow circulation of refrigerated air.
- Dunnage platforms should be 6" minimum off the floor with locking casters to allow for easy moving to receiving area and should be heavy duty construction for large loads.

THINGS TO THINK ABOUT

- Aisles of walk-in coolers and freezers should be large enough for hand trucks and carts. 36" minimum, 42" - 48" desireable. Avoid aisles over 48" since it is foolish to refrigerate aisle space!



efficient use of refrigerated space *wasted aisle space*



STORAGE: REFRIGERATED

- Refrigerated storage needs should be calculated by usable shelving square footage with approximately 1 square foot of shelf space for each student meal divided equally between cooler and freezer (verify with child nutrition director). Be generous when planning space here because it is difficult and expensive to add equipment at a later date.
- Coolers should have temperatures of +35 degrees F. (Health Department).
- Freezers should have temperatures of -10 degrees F. (Health Department).
- Walk-in cooler and freezer doors should be 36" wide minimum.
- Walk-in cooler and freezer floors should be easy to clean, non-slip finish and should be level with the adjacent kitchen floor to allow free movement of hand trucks and carts. All corners should be coved for cleanability.
- Ceilings of walk-in coolers and freezers should be a light color to reflect light.

ELECTRICAL: POWER

- Provide power connections to lights, defroster, compressor, etc., associated with refrigeration units. Provide disconnect switches as required by Code. Coordinate all requirements with kitchen equipment specifier.
- No other devices are located in this area.

ELECTRICAL: LIGHTING

- Typically, light fixtures and switches are provided with the refrigeration units. Lighting should go from the front to back of entire unit. Avoid a point source of light which leaves dark corners. This additional lighting must usually be specifically requested. Power is required for this lighting.
- If lighting is not provided with the unit it should be a source suitable for use in a cold environment, such as incandescent. It should also be a vapor tight type of light fixture.
- A light switch should be located outside the cooler or freezer or located in a vapor tight box inside the cooler or freezer door.
- Light level of refrigeration units is recommended to be 30 footcandles.
- Fluorescent typically does not operate well in cold temperatures and is extremely expensive when used for that purpose. The recommended source is incandescent.

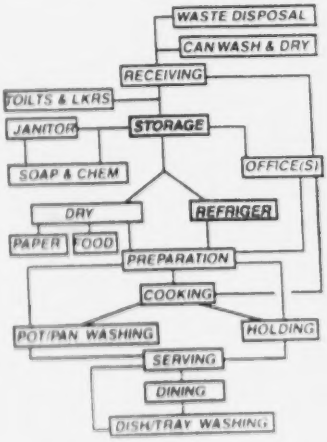
MECHANICAL

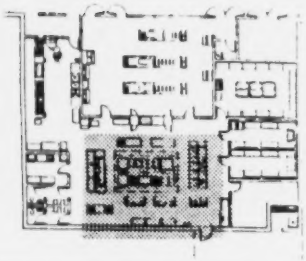
- Compressors, defroster, fans, etc., are typically provided with the unit.

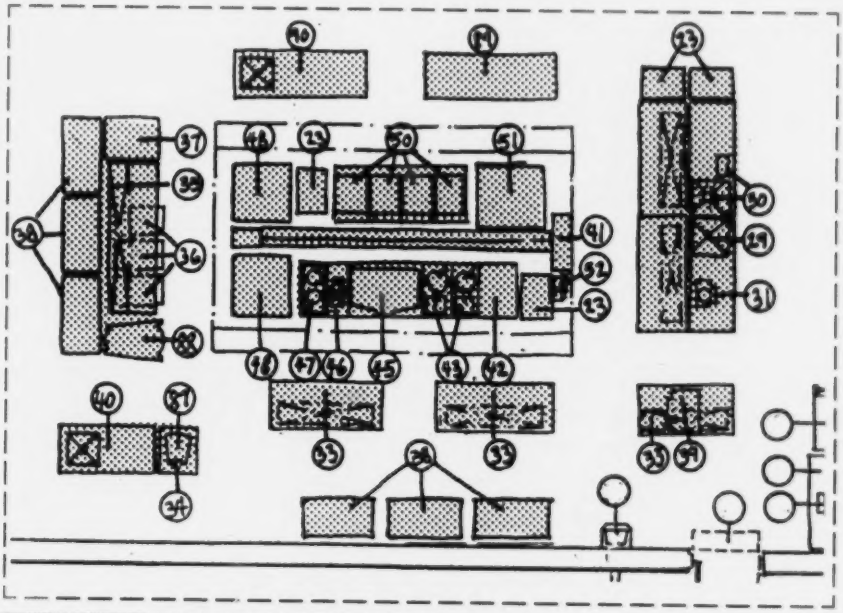
PLUMBING

- Provide a floor drain to receive condensate from refrigeration unit.
- Locating the condensing unit for walk-in coolers and freezers outside will keep heat, noise and service men out of the kitchen.

4-21

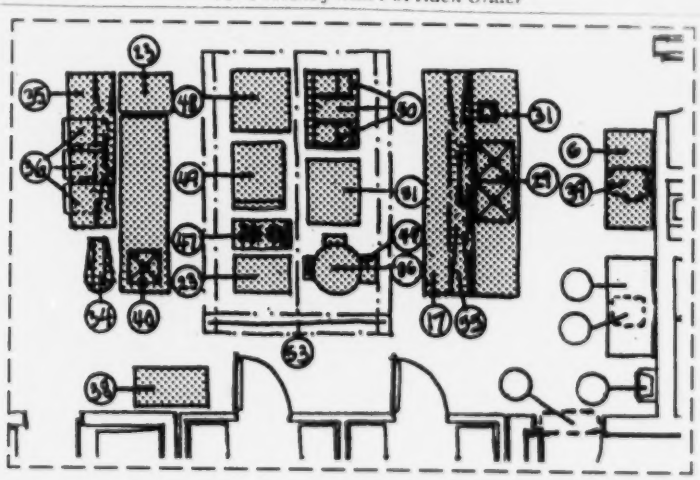


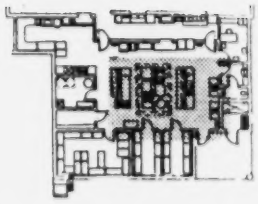




Equipment in ***Preparation/Cooking*** *area includes the following:*

6. Mobile Table
17. Work Counter
23. Utility Carts
29. Vegetable Prep Counter with Sink
30. Disposer with Control Panel
31. Food Processor
33. Mobile Work Tables
34. Mixer
35. Baker's Table
36. Ingredient Bins
37. Heater/Proofer Cabinet
38. Mobile Pot and Pan Shelving Unit
39. Slicer
40. Prep Table with Sink
41. Utility Distribution System
42. Convection Steamer
43. 10 Gallon Kettle
44. Drain with Grate
45. Braising Pan
46. Spacer with Sink and Faucet
47. Two Burner Range
48. Double Deck Convection Oven
49. 30 Gallon Fry Pan w/ Stand
50. Fryer with Filter
51. Combi Steamer/Convection Oven
52. Hose Reels
53. Ventilator with Fire Suppression
55. Overshelf with Pot Rack Under
86. 30 Gallon Kettle
87. Mixer Stand
88. 60 Quart Mixer





WHAT FOOD SERVICE EQUIPMENT GOES HERE?

AREA	MEALS SERVED PER DAY					
	200	200-400	400-600	600-800	800-1200	1200-1500
PREPARATION						
BAKER TABLES/BINS	6'X30"	6'X30"	6'X30"	8'X30"	8'X30"	8'X30"
DISPOSER (OPT.)	1 HP	1-2 HP	2 HP	2HP	2-3 HP	3 HP
DRINK FOUNTAIN	1	1	1	1	1	1
FOOD PROCESSOR	1	1	1	1	1	1-2
HAND SINKS	1 MIN.	1 MIN.	1 MIN.	2 MIN.	2 MIN.	2 MIN.
HEATER/PROOFER CAB.	1	1	1	1	1-2	2-3
MEAT SINK	1	1	1	1	1	1
MIXER	20 QT.	30 QT.	40 QT.	20 & 40 QT.	20 & 60 QT.	20 & 60 QT.
PORTABLE CARTS	1	2	3	4	5	6
POT/PAN SHELV. UNITS	1	1-2	2-3	3-4	4-5	5-6
PREP. TABLES	YES	YES	YES	YES	YES	YES
SLICER AUTO	1	1	1	1 AUTO	1 AUTO	1
VEG.SINK (2 COMPART)	1	1	1	1	1	1
VCM/HCM (CUT/MIX) (OPT)				1	1	1
WORK TABLES	YES	YES	YES	YES	YES	YES
COOKING						
COMB. OVEN/STEAM ER (OPT.) **				1	1	1
CONVECTION OVEN **	1	1-2	2	2	2-3	4
CONVECT. STEAM.ER **	1	1	1	1	1	2
COOKS SINKS	1	1	1	1	1	2
COOLING RACKS	1	1	1-2	2	2-3	3-4
EXHAUST HOOD	1	1	1	1	1	1
FRYER (OPTIONAL)	(1)+/-40LB.	(1)+/- 60LB.	(2)+/-40LB.	(2)+/-60LB.	(2)+/-40LB.	(3-4)+/-60LB.
FRYER FILTER (DESIRE)	1	1	1	1	1	1
RANGE (TWO BURNER)	1	1	1	1	1	1
TRUNNION KETTLES	(1) 5 GAL	(1) 10 GAL	(1-2) 10 GAL	(2) 10 GAL	(2) 10 GAL	(2) 10 GAL
KETTLES (BULK)	20 GAL	20-30 GAL	30-40 GAL	20-40 GAL	(2) 40 GAL	(3) 40 GAL
TILTING SKILLET	30 GAL	30 GAL	30-40 GAL	40 GAL	40 GAL	40 GAL

**Convection ovens, convection steamers and combination oven/steamers may be used in combination. Therefore, total number of units should be taken into consideration.

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- Equipment selection should be determined by menu (bulk cooking or batch cooking) but should be as multi-purpose as possible to allow for future menu changes. Keep equipment as simple as possible to get the job done. More 'buzzers and bells' usually means more service problems.
- Specify back covers for equipment when it will sit in the open with the back visible.
- Stainless steel is usually less expensive over an extended period of time. Try to avoid painted finishes when possible to reduce maintenance costs.
- At hand sink provided in this area, provide soap and hand towel dispensers.
- Pot and pan storage racks should be mobile type to allow movement from pot and pan washing area.
- At baking area provide a baker's table with backsplashes to contain spills and mobile ingredient bins for easy transport from storage area.
- Provide a clock in this area located for best visability.

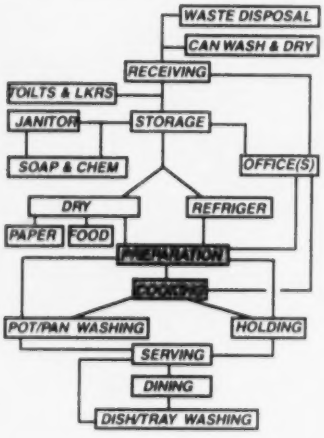
THINGS TO THINK ABOUT

- The organization of cooking equipment must take into consideration space, time and labor. Each item of equipment relates to the food that is being received from the food preparation area as well as where the final cooked product will be delivered. Installing cooking equipment in a central location will greatly aid cleaning and increase kitchen efficiency. Ranges, ovens and steam equipment should be placed away from walls to allow easy cleaning. Specifying locking casters will allow easy movement of equipment for repair and service.
- See Chapter 3 regarding decisions on fuel sources.
- Provide parking space adjacent to each work area for mobile carts used to transport food from storage areas.
- Baker's area should be convenient to a water source, mobile proofing cabinet, mixer(s) and oven(s).
- All corners of work surfaces and sinks should be coved for ease of cleaning (1/4" radius minimum - 5/8" to 3/4" radius desirable).

ELECTRICAL: POWER

- Provide power connections to all preparation and cooking equipment. All requirements should be carefully coordinated with the kitchen equipment specifier. Verify voltage and amperage requirements as well as the type of connection required.
- All devices mounted near the floor should be weather proof. These devices should also be hard piped several inches off the floor to allow for easier cleaning with mops and brooms.
- Provide power connections to hood lights, which are typically provided with the hood. If no lights are provided with hood, provide vapor tight gasketed light fixtures with a switch on the hood.

3-19



- Provide power to the kitchen exhaust and supply fans.
- Provide power to HVAC equipment for this area.
- Provide convenience outlets throughout this area. Coordinate locations with kitchen equipment specifier and user. Provide outlets throughout prep area for small portable appliances.

ELECTRICAL: LIGHTING

- Recommended light level in the kitchen area is 75 footcandles.
- The lighting should be energy efficient, easily maintained, with a long lamp life such as fluorescent.
- Light fixtures in this area should be lensed and gasketed to prevent moisture from entering the fixture and causing damage.
- A switch should be located in a central location for control of lights in this area.
- Emergency lighting should be provided in the area to meet the requirements of the life safety code.

ELECTRICAL: AUXILIARY SYSTEMS

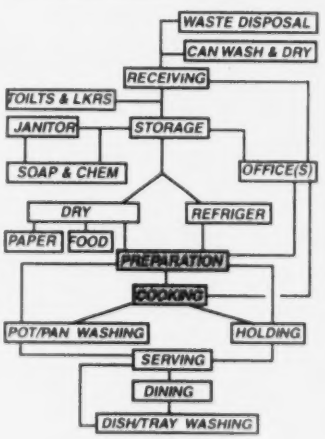
- Connect hood fire suppression system to building fire alarm system.

MECHANICAL FOR PREPARATION AREA

- The HVAC system should consist of a ducted constant volume supply and return system.
- This should be part of the system that serves cooking and serving.
- The system design should be based on a minimum cooling load of 48 Btu/sf.
- The outside air requirement is based on 20 CFM per person of actual occupancy.
- This unit will provide the balance of make-up air to replace the air exhausted by the kitchen exhaust hood.

MECHANICAL FOR COOKING AREA

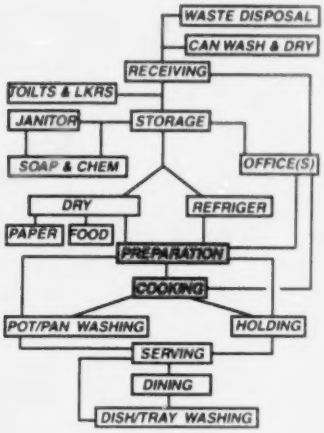
- The HVAC system should be a ducted constant volume supply to the area.
- The system should be part of the system that serves the preparation and serving areas.
- The system design should be based on a minimum cooling load of 100 Btu/sf with room temperature of 80 degrees F.
- All the air supplied to the cooking area will be exhausted through the kitchen hood.



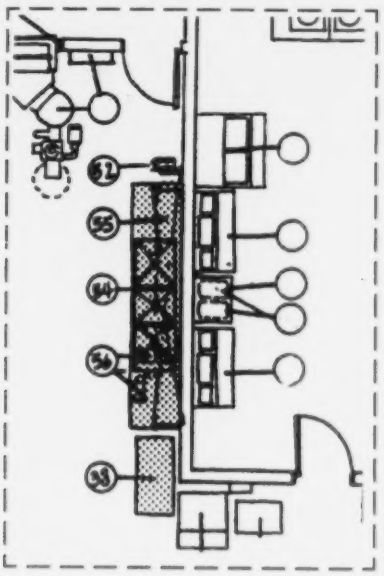
- The kitchen hood should be U.L. listed, designed in accordance with NFPA 96. The system should consist of a welded stainless steel exhaust hood, exhaust ductwork (welded) and a gas direct fired make-up air unit or electric make-up air unit. The make-up air unit will reduce the quantity of heat or conditioned air exhausted from the kitchen. The exhaust fan and make-up unit should be roof mounted. Exhaust hood is required to have a fire protection system that also shuts off fuel to the cooking equipment.
- The kitchen exhaust hood should overhang all equipment by minimum of 9".

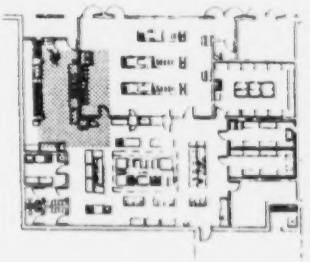
PLUMBING

- In prep area, provide hand wash sink (preferably stainless steel) with electric eye or foot pedal operation to eliminate hand contact with faucet handles. If budget does not allow this, provide gooseneck spout and wrist blade handles.
- All prep sinks should have wrist blades to reduce food contact with faucet handles.
- Provide garbage grinder in drain of prep sink, only if approved by local plumbing official.
- All floor drains and waste outlets from cooking equipment, such as kettles, should be piped to a central grease interceptor.
- If gas is used for cooking equipment, provide a master gas shut-off valve for gas operated equipment.



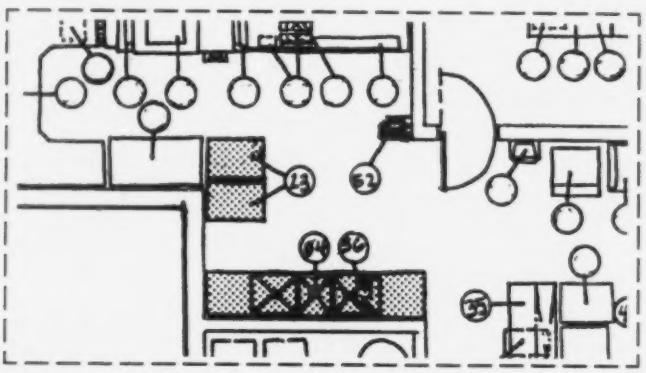
POT AND PAN WASHING

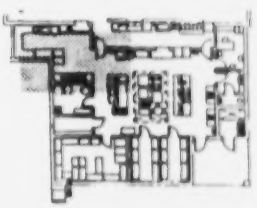




Equipment in ***Pot and Pan Washing*** *area includes the following:*

23. Utility Carts
38. Mobile Pot & Pan Shelving Units
52. Hose Reels
54. Pot and Pan Sink with Drainboard
55. Overshelf with Pot Rack Under
56. Sink Sanitizer





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POT AND PAN WASHING

WHAT FOOD SERVICE EQUIPMENT GOES HERE ?

AREA	MEALS SERVED PER DAY					
	200	200-400	400-600	600-800	800-1200	1200-1500
POT/PAN WASHING						
3 COMPART. SINK	1	1	1	1	1	1
SINK SANITIZER	1	1	1	1	1	1
HAND SINK	1	1	1	1	1	1

- A garbage disposal with a pre-rinse spray is useful at the "soiled" end of the operation.
- A three compartment sink should be provided and a four compartment sink is desirable if space allows. One compartment is provided for each of the three pot/pan washing steps of washing, rinsing and sanitizing. The sanitizing compartment must be large enough to totally submerge the largest pot/pan being used in the facility. Sanitizer to maintain 180 degree minimum hot water and chemical injector.
- Drainboards should be provided for each end of the pot and pan sinks and should be as wide as the widest sink compartment.

THINGS TO THINK ABOUT

- Locate the operation near the dishwasher so that pots and pans may be run through dishwasher for sanitizing.
- The "soiled" drainboard end of the operation should not be adjacent to a "clean" area to reduce the chance of cross contamination.

ELECTRICAL: POWER

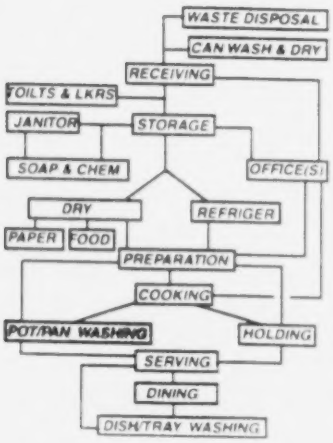
- Provide power connections to food service equipment in this area.
- Electrical devices located at the floor should be weatherproof and installed such that cleaning around them with a broom or a mop is not a problem.

ELECTRICAL: LIGHTING

- Recommended light level for this area is 50 foot candles.
- The type of lighting should be similar to what is used in the kitchen and serving area.
- Lights can be controlled with kitchen lights.

MECHANICAL

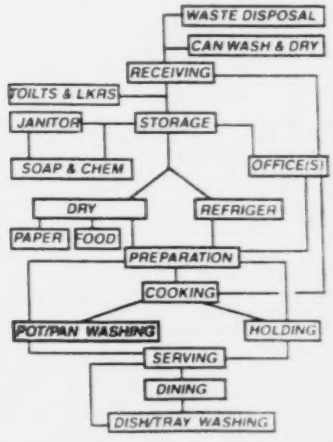
- The HVAC system should consist of a ducted constant volume supply and return system.
- This should be part of the system that serves cooking and serving.
- The system design should be based on a minimum cooling load of 48 Btu/sf.



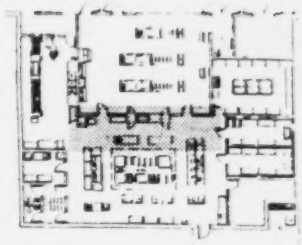
- The outside air requirement is based on 20 CFM per person of actual occupancy.
- This unit will provide the balance of make-up air to replace the air exhausted by the kitchen exhaust hood.

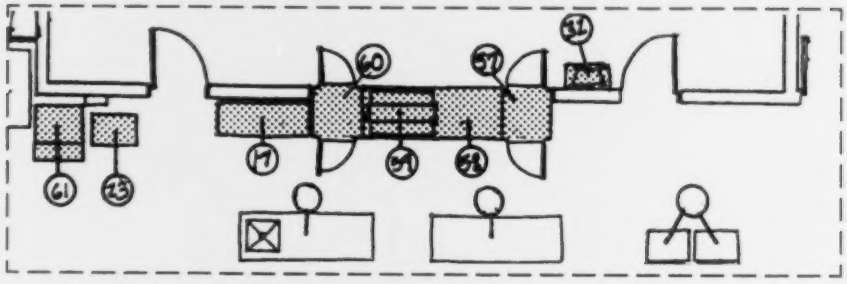
PLUMBING

- Provide plumbing connections to equipment that may be located in this area.
- Faucets should have 3/4" supplies if possible to allow compartments to fill faster.
- Sink compartment drains should be lever handle style.



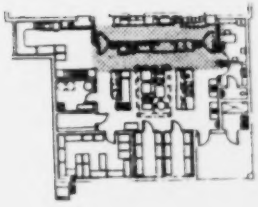
HOLDING

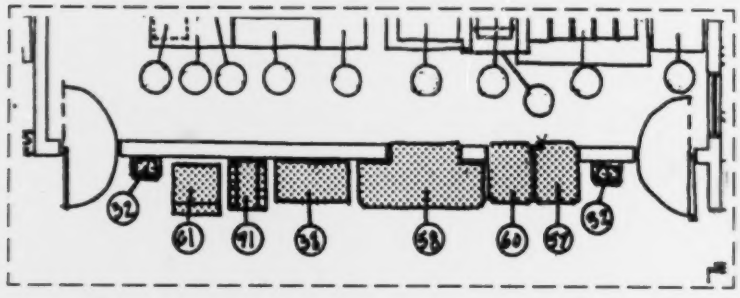




Equipment in Holding area includes the following:

17. Work Counter
23. Utility Carts
32. Hand Sink
57. Pass Through Hot Cabinet
58. Pass Through Work Counter
59. Food Warmer
60. Pass Through Refrigerator
61. Ice Maker and Bin





HOLDING

WHAT FOOD SERVICE EQUIPMENT GOES HERE?

AREA	MEALS SERVED PER DAY					
	200	200-400	400-600	600-800	800-1200	1200-1500
HOLDING						
HEATED CABINET	20 CF	20 CF	20 CF	20 CF	20-40 CF	40 CF
REFRIG. CABINET	20 CF	20 CF	20 CF	20 CF	20-40 CF	40 CF

- Pass-thru heated and refrigerated cabinets are a good way to hold food between the kitchen and serving area. They may be loaded on the kitchen side and unloaded in the serving area. Consider glass doors on the kitchen side of pass-thru holding cabinets so that the kitchen staff can see when the food supply is low without opening the door.

THINGS TO THINK ABOUT

- Locate the heated holding cabinet(s) near the cooking equipment and the heated serving counter(s) and locate the refrigerated holding cabinet(s) near the cold food preparation area and the cold food serving counter(s).
- Consider half size doors on holding cabinets since less refrigeration or heat will escape when the doors are opened.

ELECTRICAL: POWER

- Provide power connections to food service equipment in this area.
- Electrical devices located at the floor should be weatherproof and installed such that cleaning around them with a broom or a mop is not a problem.

ELECTRICAL: LIGHTING

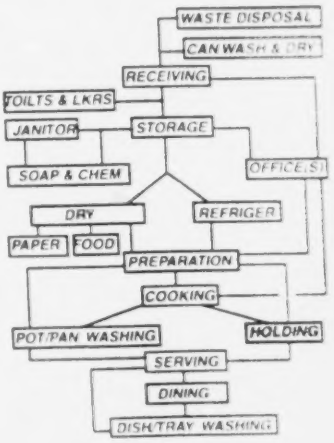
- Recommended light level for this area is 50 foot candles.
- The type of lighting should be similar to what is used in the kitchen and serving area.
- Lights can be controlled with kitchen lights.

MECHANICAL

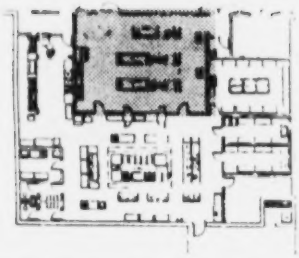
- The HVAC system should consist of a ducted constant volume supply and return system.
- This should be part of the system that serves cooking and serving.
- The system design should be based on a minimum cooling load of 48 Btu/sf.
- The outside air requirement is based on 20 cfm per person of actual occupancy.
- This unit will provide the balance of make-up air to replace the air exhausted by the kitchen exhaust hood.

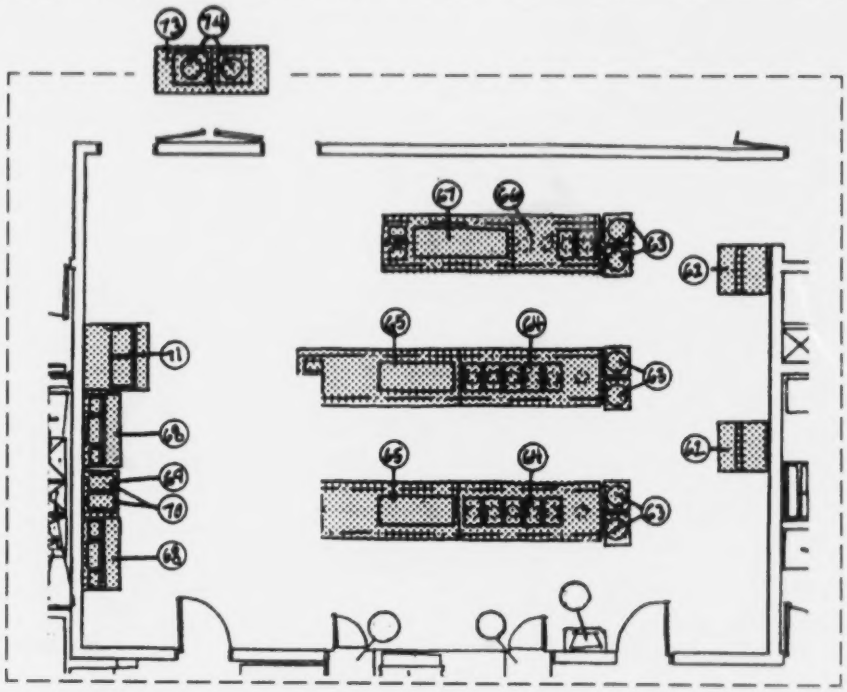
PLUMBING

- Provide plumbing connections to equipment that may be located in this area.



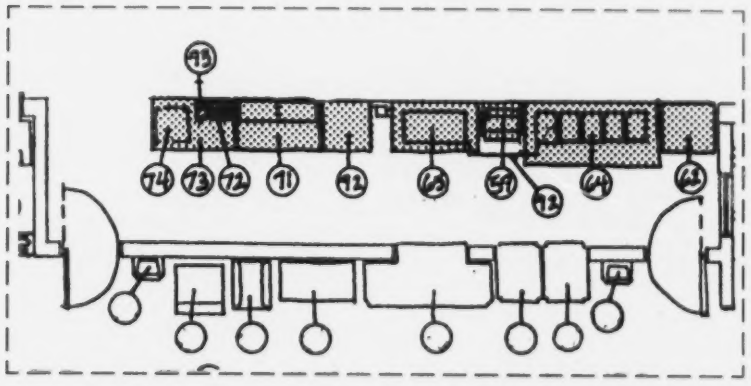
SERVING

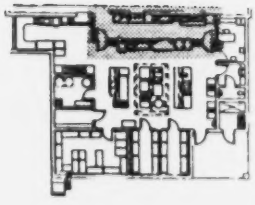




Equipment in **Serving** *area includes the following:*

62. *Milk Coolers*
63. *Mobile Tray Dispensers*
64. *Hot Food Counters*
65. *Cold Food Counters*
66. *Counter with Two Hot Wells*
67. *Salad Bar*
68. *Condiment Counter*
69. *Tea Rack*
70. *Tea Dispensers*
71. *Ice Cream Cabinet*
72. *Silver Cylinder Holder*
73. *Cashier's Stand*
74. *Cash Register*





WHAT FOOD SERVICE EQUIPMENT GOES HERE?

AREA	MEALS SERVED PER DAY					
	200	200-400	400-600	600-800	800-1200	1200-1500
SERVING						
CASHIER'S COUNTER	1	1	1-2	2	2-3	4
ICE CREAM CABINET	1	1	1	1	1-2	1-2
MILK COOLERS	1	1	2	2	2-3	4
SERVING COUNTERS	1	1	2	2	2-3	3-4
SPECIALTY CNTRS (OPT)	1	1	2	2	2-3	3-4

- Determining an anticipated menu and type of service offered will help establish the type of serving counters required.
- When ordering equipment for serving try to keep it flexible as possible to allow for a changing menu.

3-11

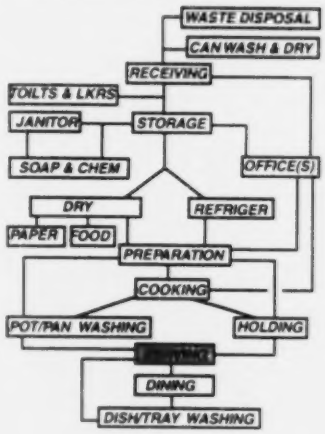
THINGS TO THINK ABOUT

- We are in the computer age! Conduit dedicated solely for computer cashier stations should be provided.
- Casters on all serving equipment will allow it to be moved easily for cleaning. Casters will also allow equipment to be rearranged if service changes.
- Hot and cold counters should be sectional to allow equipment to be possibly rearranged if needed.
- Lift-up sneeze guards on self-service counters will allow food to be loaded easily.
- The corners of work surfaces should be coved for easy cleaning. Use 1/4" radius minimum with a 5/8" - 3/4" radius desireable.
- Individual heat lamps should be provided over hot food wells. Each lamp should have its own on/off switch to allow well to be used other than "hot."
- Serving counter height will be determined by the type of school or age of the student.
  - For self-serve counters:

Elementary	27" high.
Middle	30" high.
High	34" high.

  - For traditional serving counters 34" high the tray slide should be set at:

Elementary:	27" high.
Middle	30" high.
High	34" high.



- Lower serving lines should be very carefully planned because of the potential strain they may cause to employees' backs. Consider the possibility of a step down so that employees do not have to bend. This can make employees' jobs easier and reduce liability on the part of the school food service facility.
- Menu boards should be provided to display daily menus and notices to students. Signage should be specified to label doors from dining IN, OUT, etc.

ELECTRICAL: POWER

- Provide power connections to serving cabinets, salad bars, cold food bins, etc., located in this area. Coordinate requirements with kitchen equipment specifier.
- Electrical devices located near the floor should be weather proof. They should be hard piped several inches off the floor to provide easier cleaning of floors with mops and brooms.

ELECTRICAL: LIGHTING

- Recommended light level for this area is 50 footcandles.
- The type of lighting used should be similar to what is provided in the kitchen.
- Lighting should be controlled in the kitchen area by a switch. The switch should probably NOT be located in an area accessible by students.
- Lighting should be designed so that the lighting level over the serving line is 50 foot candles.
- Lighting fixtures should be lensed and gasketed.

MECHANICAL

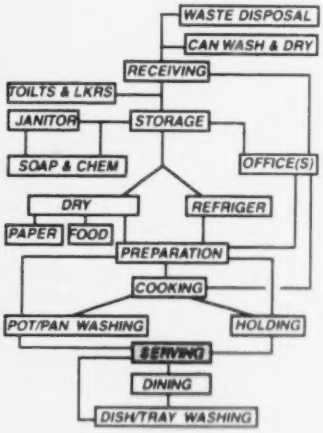
- The HVAC system should consist of a ducted constant volume supply and return system.
- This should be part of the system that serves cooking and preparation.
- The system design should be based on a minimum cooling load of 48 Btu/sf.
- The outside air requirement is based on 20 CFM per person of actual occupancy.
- This unit will provide the balance of make-up air to replace the air exhausted by the kitchen exhaust hood.

PLUMBING

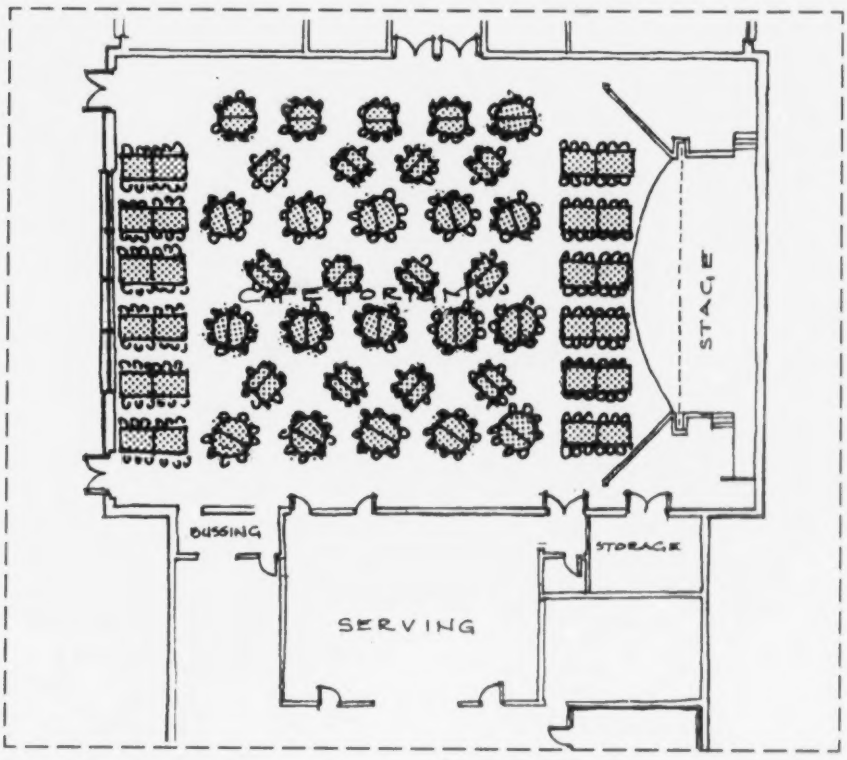
- Provide a water filtering system on the water supply for all beverage dispensers and ice cube makers.

5-42

EQUIP/TECH GUIDELINES



DINING



Note: Restrooms should be provided adjacent to the dining area if the cafeteria will be used for other events such as evening meetings, catering, etc.

Equipment in ***Dining*** *area includes the following:*

- *Dining furniture*
- *Drinking fountains*
- *Trash receptacles*
- *Bulletin boards*
- *Stage, lighting, etc., if Dining is multi-use room*

WHAT FOOD SERVICE EQUIPMENT GOES HERE?

- The dining furniture provided here should be durable and easy to clean. The same rule which applies to the rest of the food service equipment applies here: what you pay for something is not necessarily what it costs. Buy the best furniture the budget will allow. A lot of students use this furniture every school day...it needs to be tough! The dining furniture selected should be flexible for the type of dining space required (cafeteria, cafetorium, commons area, etc.). Another important factor to consider is how easily can this area be cleaned with the dining equipment you select.

4-33

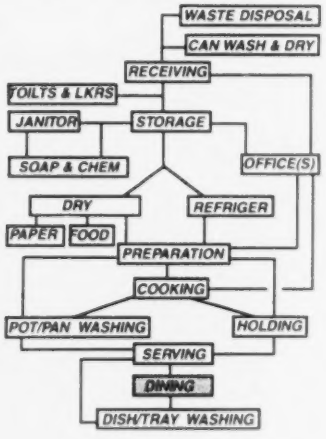
- The basic choices for dining tables/seats are:
    - Tables with stools attached (Stool Tables)
    - Tables with benches attached (Bench Tables)
    - Tables with benches attached that convert to auditorium style seating (Auditorium Tables)
    - Tables and Chairs

- Let's look at the pros and cons of each choice:

STOOL TABLES

- Can typically seat up to 1/3 more students than with other choices.
- Requires 1 person to fold-up and move 1 table and 12 stools.
- Aisles can be more narrow as there are no chairs to slide in and out.
- No awkward lifting of legs to get on to benches.
- Most manufacturers allow stools to be detachable to let wheelchairs slide up to tables.
- Most manufacturers offer optional backrests for the stools.

- Limited in choice to rectangular shaped tables.
- If cafeteria is also heavily used as an auditorium, tables may not be the best seating choice and may inhibit sight lines.
- If dining is used by many outside groups for meetings, dances, etc., adults may prefer chairs for a more "grown-up" feeling.
- It is suggested that tables and chairs for 20-40 adults are provided in addition to the stool tables for students.



BENCH TABLES

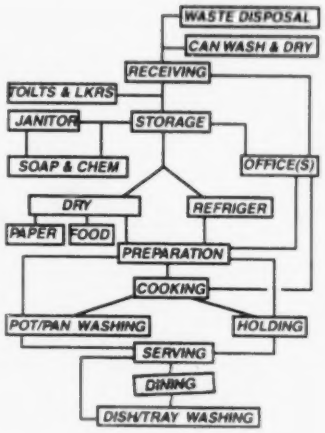
- Benches can be removed and chairs can be rented for banquets, etc., to accommodate adults.
- Requires 1 person to fold-up and move 1 table and benches that carry a capacity of 12.
- Aisles can be more narrow as there are no chairs to slide in and out.
- Benches can be removed to allow wheelchairs to roll up to table although a whole side will lose bench seating (unlike stool tables)
- Folded tables store efficiently.

- Limited in choice to rectangular shaped tables.
- If cafeteria is also heavily used as an auditorium, tables may not be the best seating choice and may inhibit sight lines.
- If dining is used by many outside groups for meetings, dances, etc., adults may prefer chairs for a more "grown-up" feeling.
- Sitting down requires awkward lifting of legs to get on to benches - when benches are at full capacity it is very difficult to get on and off seating.

AUDITORIUM TABLES

- If cafeteria is also heavily used as an auditorium, tables are the ideal choice to maximize seating capacity and sight lines.
- Tables are ideal for testing/study set-up.
- Aisles can be more narrow as there are no chairs to slide in and out.
- Benches are adaptable without the use of tools to allow wheelchairs or chairs to be used at the table.
- Tables nest together to store efficiently (although not as efficiently as bench and stool tables).

- Limited in choice to rectangular shaped tables.
- If dining is used by many outside groups for meetings, dances, etc., adults may prefer chairs for a more "grown-up" feeling.
- Sitting down requires awkward lifting of legs to get on to benches - when benches are at full capacity it is very difficult to get on and off seating.



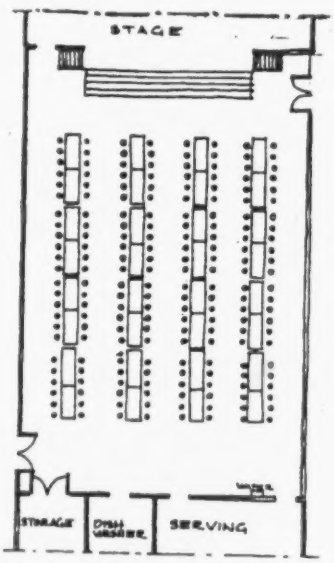
TABLES AND CHAIRS

- If cafeteria is also heavily used as an auditorium, chairs can be used alone to maximize seating capacity and sight lines.
- No limit to table shape and size.
- If dining is used by many outside groups for meetings, dances, etc., adults prefer chairs for a more "grown-up" feeling.
- Wheelchairs or chairs can be used at the tables with no pre-planning.
- The most flexibility is offered with tables and chairs for multi-use spaces.

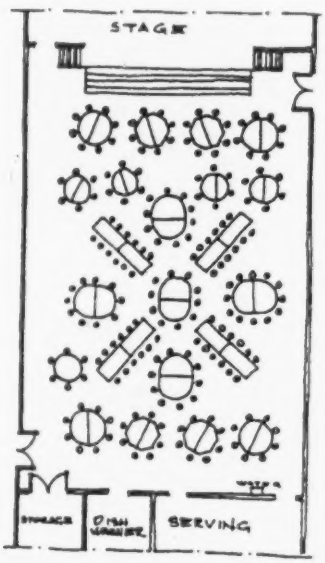
- Chairs are extremely time consuming to put into place and move for cleaning.
- Aisles must be wider to accommodate the sliding of chairs in and out from tables.
- Constant sliding of chairs is noisy.
- Visually, dining area may look "messy" with chairs in no rigid pattern.
- Chairs could be used as a potential weapon by students.
- Storage space must be greater for tables and stacking chairs.

THINGS TO THINK ABOUT

To avoid an institutional look:



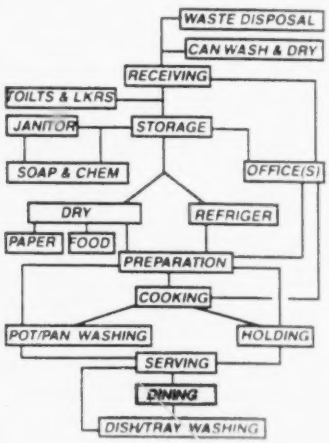
Don't put the maximum number of tables in the minimum space possible by lining up long narrow tables.



Do vary the shape, size, and arrangement of tables.

5-46

EQUIP/TECH GUIDELINES



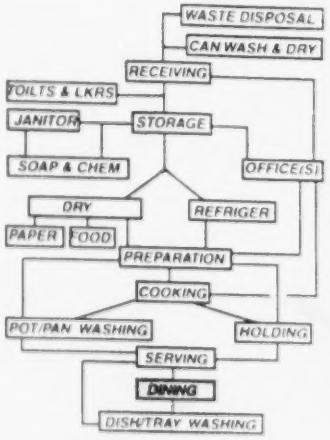
- Seating is usually provided for 1/3 of student population.
- The furniture that goes in the space should be adaptable for all uses planned for the dining space.
- Typically, standard size tables are used and small children adapt (this is much easier than adults sitting on child sized furniture) .
- No one table/seating system is ideal. Consider mixing and matching different choices for variety and flexibility in the dining area.
- If chairs are provided, specify plastic, noise resisting glides to reduce noise and eliminate rust marks on tile floors after they have been washed.
- Colors of tables/seats may be changed for variety or to specify specific locations of different age groups.
- Solid color table tops usually show more wear.

ELECTRICAL: POWER

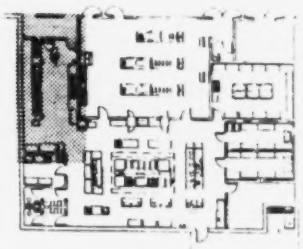
- Provide convenience receptacles throughout the dining area.
- If the dining area has a stage, provide additional receptacles in this area. Floor receptacles may also be provided in this area if needed. Coordinated with any sound equipment that may be used or specified.

ELECTRICAL: LIGHTING

- The Illuminating Engineering Society (IES) recommended light level in this area is 10 footcandles. However, since the area has a high level of activity the level should probably be 30 footcandles.
- Since this room is considered an assembly area, emergency lighting should also be provided.
- The type of lighting used can be varied. However, the following factors should be considered in the selection process:
  - Energy efficiency
  - Lamp life (maintenance does not want to be changing bulbs every month)
  - Maintainability (if the fixture has grilles or lenses that show dirt easily or need constant adjustment they probably would not be a good choice)
- In areas with high ceilings, a pendant mounted fluorescent direct, semi-direct, or indirect may be a good choice. Choose a high quality fixture and lens type that requires minimal maintenance.
- In areas with a standard ceiling height and lay-in ceilings a 2' x 4' lay-in troffer would work well.
- If the dining area has a stage, provide additional lighting here for a minimum level of 50 footcandles, with dual level switching.
- If the budget permits, provide some dimmable lighting, possibly with some spot lighting for on stage activities.

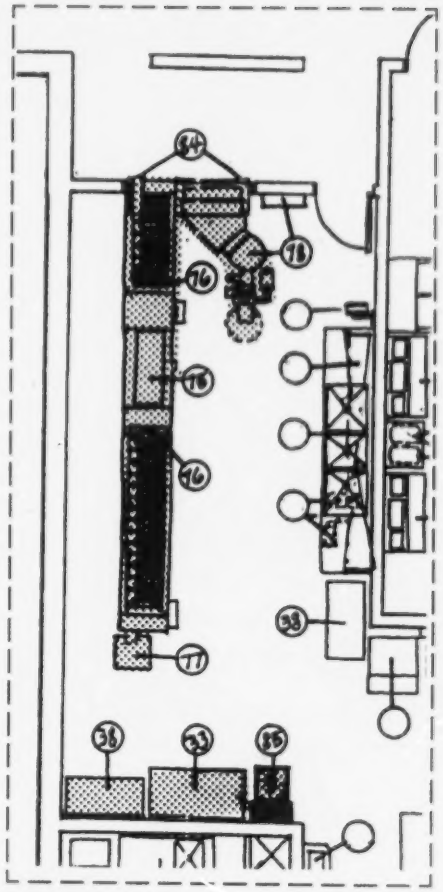


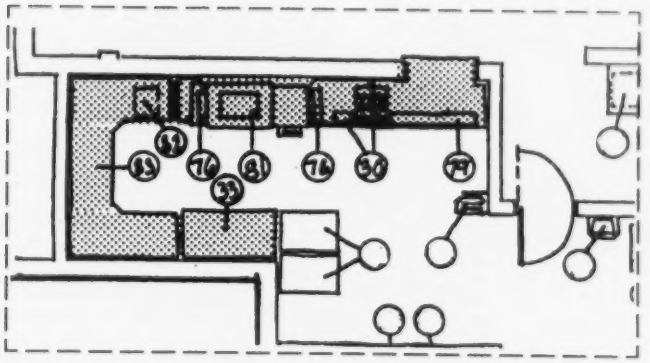
DISH/TRAY WASHING

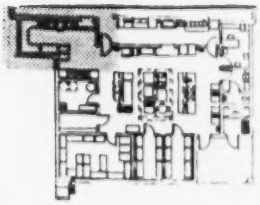


Equipment in Dish/Tray Washing area includes the following:

23. *Utility Carts*
30. *Disposer with Control Panel*
38. *Mobile Pot & Pan Shelving Units*
75. *Self Bussing Conveyor Dishwasher*
76. *Stainless Steel Ducts*
77. *Silver Cart*
78. *Pulper/Extractor with Feed Trough*
79. *Soiled Dishtable*
80. *Pre-Rinse Spray*
81. *Dishwasher with Pre-Wash*
82. *Booster Heater*
83. *Clean Dishtable*
84. *Stainless Steel Frame*
85. *Mobile Silver Soil Cart*







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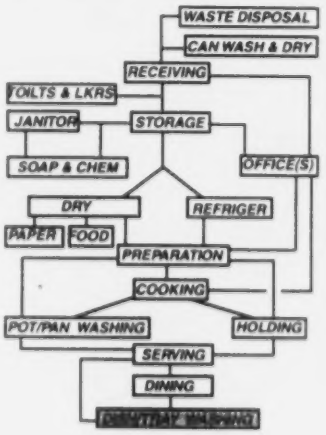
WHAT FOOD SERVICE EQUIPMENT GOES HERE?

AREA	MEALS SERVED PER DAY					
	200	200-400	400-600	600-800	800-1200	1200-1500
DISH/TRAY WASHING						
BOOSTER HEATER	1	1	1	1	1	1
CLEAN DISH TABLE(30" WIDE)	8 FT	8-10 FT	10-12 FT	12-14 FT	14 FT	14-16 FT
DSHWSHR (20"X20"RACKS/HR)	50	50	200	200	270	270
DISPOSER (DESIRABLE)	2 HP	2 HP	3 HP	3 HP	3 HP	3-5 HP
HAND SINKS	1	1	1	1	1	1
HOSE REEL (DESIRE)	1	1	1	1	1	1
PORTABLE CARTS	1	1	1-2	2	2-3	4
PRE-RINSE SINK W/ SPRAY	1	1	1	1	1	1
SILVER SORT TABLE			1	1	1	1
SOILED DISH TABLE (30"WIDE)	8 FT	8-10 FT	10-12 FT	12-14 FT	14 FT	14-16 FT

- A soak sink is useful in the scraping area for soaking flatware before washing. An opening with a chute to a portable sink can be provided below the dish return window to allow students to return flatware.
- In larger schools where two or more employees are scraping dishes, a scraping trough connected to a disposal is helpful. Food is "flushed" by water flow to the disposal.
- The soiled dish table should be large enough to allow accumulation of trays/ dishes while pre-rinsing.
- It is desirable that the pre-rinse section be provided with an overhead spray and disposer.
- The washer requires a sanitizing section with a minimum of 180 degree F. hot water required for final rinse. Provide a built-in booster heater or a separate booster heater for 180 degree F. building hot water. The washer should have chemical injectors for the final rinse.
- If using an automatic conveyor dishwasher the clean dish table should be at least 7 feet long so the dishwasher can automatically push a minimum of 4 dish racks. A shorter table will be labor intensive. Provide open space under the clean dish table for parking rack dollies. This should be small (20" maximum) to allow removal and washing/sanitizing in dish/tray washer.

THINGS TO THINK ABOUT

- The pre-rinse section of the soiled dishtable should be located near the dish-washer so that unnecessary steps will be eliminated to load the dishwasher.
- Overhead rack shelves are useful above the soiled and clean tables when glasses are being used.



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DISH/TRAY WASHING

- A hand washing sink with soap and towel dispensers should be in the area or immediately adjacent to the area.
- Provide generous aisles to allow for portable equipment to be moved through area.
- Provide area for parking of portable tray/dish equipment.

ELECTRICAL: POWER

- Provide power to all warewashing equipment and booster heaters located in this area.
- Provide power to sink heaters. Verify location and requirements with plumbing consultant.

ELECTRICAL: LIGHTING

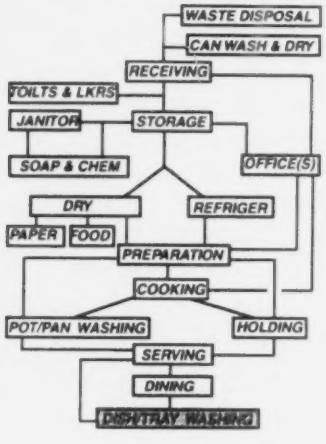
- Recommended light level for this area is 20 footcandles, however, lighting levels of around 50 footcandles are usually desired.
- The lighting should be energy efficient type similar to what is located in the cooking and preparation areas.
- The lighting may be controlled by a switch located near the entrance to this area or it may be controlled with the cooking area lighting.
- Light fixtures should be lensed and gasketed.

MECHANICAL

- During the entire wash, rinse and dry cycle large quantities of heat and steam are released. Exhaust and steam are released. Exhaust hoods should be installed at the entrance and exit to the washer. Exhaust rate of the hoods - 15 air changes/hour to 25 air changes/hour for large to small rooms respectively.
- Exhaust system is separate from the building HVAC system. Ductwork should be non-corroding (aluminum or stainless steel), welded and sloped to drain.
- Make-up air should be tempered and filtered.
- Make-up air unit and exhaust fan should be wired to run when the dishwasher is running.

PLUMBING

- Provide booster heaters capable of a 60 degree F. temperature rise (120 degrees F. - 180 degrees F.) for all warewashing equipment. Electric booster heaters may be purchased with the dishwasher, or a separate booster heater may be installed.
- Provide an immersion heater in pot sink to maintain 180 degree F. water.
- Locate water heaters as close to the equipment they serve as possible. This reduces piping and insulation cost and heat loss)
- Domestic water storage tanks (180 degrees F.) can reduce the size of electric service for booster heaters.
- Verify whether the equipment will be specified by kitchen equipment specifier or plumbing engineer.

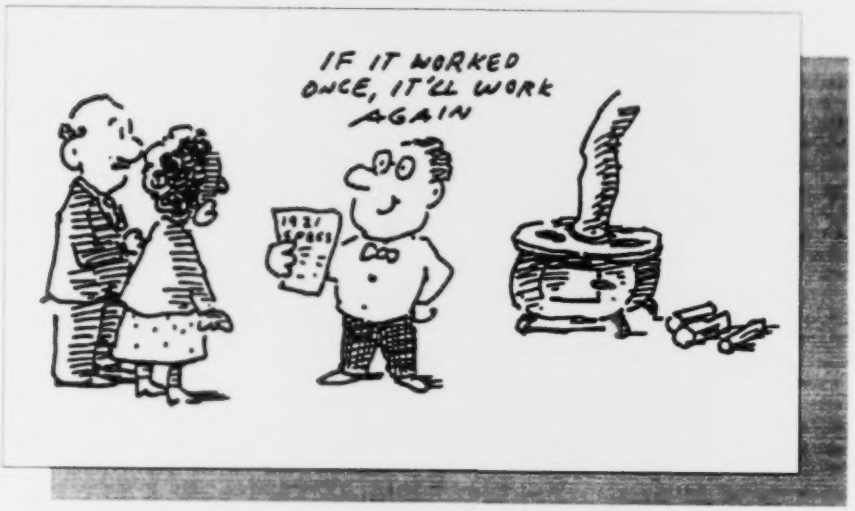


THE PITFALLS OF WRITING SPECIFICATIONS

Specifications here mean technical specifications. While a food service design project will affect many parts of the project specifications, the main concern is the specifications for equipment, mechanical, electrical and plumbing. It is here that a knowledgeable food service consultant can be invaluable on a project. After all, specialized spaces require specialized knowledge.

Because the preparation of food service equipment specifications can be a daunting task, perhaps it is better to start with some things to avoid and then offer some suggestions of what to include and how to approach this task. We don't wish to be negative...but there are seven problems or pitfalls which seem to occur over and over again in food service work. Avoiding these pitfalls puts you well on the way to providing good food service specifications.

PITFALL NO. 1: WE'VE GOT SOMETHING AROUND HERE...



A common approach is to find old specs or guidelines from previous projects and use these as a "reference." This is OK, but do not use these documents "as-is!"

No food service facility is like any other (not to mention how quickly equipment becomes obsolete in our ever- changing world of high technology). The best that old specs can do is offer a rough guideline of what should be covered. The copy machine is not a friend in this case.

PITFALL NO. 2: YOU'LL DO ALL THE WORK FOR ME? GREAT!!

Salesmen are a great source for equipment information. After all, who knows equipment better than they do? But remember, they are salesmen, not impartial kitchen consultants. Their job is to sell you equipment. They do not release the architect or owner from making decisions and comparisons and doing homework on the best equipment available to do the job needed.

PITFALL NO. 3: WHAT DO YOU MEAN THIS EQUIPMENT WON'T WORK HERE?

Believe it or not, it has happened. Equipment has been bought and paid for that couldn't be installed because it was gas and the facility was all-electric. Or equipment couldn't be used because the plumbing lines were too small. Be careful about coordinating electrical and mechanical requirements of the equipment on the project. This is especially true for renovations and additions. The "Getting Starting" Facility Data Sheet in Chapter 3 and the Checklist for Buying Equipment Directly in this Chapter will be extremely useful in making sure the equipment specified will work with decisions regarding utilities and plumbing or with existing conditions.

Also, be sure that when equipment is being provided directly by a vender with no contractor involved, the structural supports or load capacity of the structure to accommodate the equipment is verified by a registered structural engineer.

PITFALL NO. 4: YOU KNOW YOU'LL GET THE CHEAPEST THING SPECIFIED...

When using proprietary specifications, the equipment specified should all be equal in terms of features provided and quality of fabrication. This is a difficult thing to do. Every manufacturer makes a slightly different piece of equipment. The least expensive piece of equipment will be provided, so don't specify it unless you will be happy with it! Make sure the description of the equipment you give in the specs is complete. There will be no trouble in determining whether an offered substitute is really equal in all aspects. Remember, the architect and owner have the final say as to whether equipment offered "as equal" meets the criteria they have established in the specifications.

PITFALL NO. 5: NOT SPECIFYING QUALITY FROM THE START...

Specify the highest quality the budget will allow. Always specify heavy duty not restaurant weight equipment. Restaurant weight equipment is only one step above home appliance weight. Cheap equipment becomes expensive when it deteriorates rapidly or breaks down often.

WHAT TO INCLUDE IN THE SPECIFICATIONS

SOME BASIC RESOURCES:

Now with those nasty things out of the way, we've provided a short listing below of some basic requirements and current standards that are pretty common to food service specifications:

- *United States Public Health Service Food Service Sanitation Manuals*
- *National Sanitation Foundation Pamphlets*
- *ASHRAE*
- *National Fire Protection Association Codes (NFPA)*
- *County Health Department regulations*
- *Grease hood to meet NFPA 96*
- *Grease hood to meet UL regulations*
- *All cooking equipment to meet UL regulations*
- *Fire suppression to meet UL & NFPA*
- *Refrigeration equipment to meet ARI standards*
- *Water heaters to meet ASHRAE standard 90.1-1989*
- *Americans with Disabilities Act*

WHAT MUST BE INCLUDED IN EQUIPMENT SPECS

- **Quantity**

  This is the number of items you wish to purchase.

  Example: One (1) each or one (1) dozen.

- **Description**

  This is the generic name for the item.

  Example: Work table, steamer, range, convection oven, dishwasher, etc.

- **Manufacturer**

  List the name of the desired manufacturer here.

  Example: ABC Range Company or XYZ Incorporated.

- **Model Number**

  Give the manufacturer's model number for the item required.

  Example: Model number 123-456-A.

- **After listing the manufacturer and the model number, always follow with the statement "or prior approved alternate that meets or exceeds the specifications in capacity, utilities and benefits."**

  This will allow competitive bidding by all those manufacturers that have products with the features you require.

  Example: One (1) each convection oven; ABC Range Company Model Number 123-456-A or prior approved alternate that meets or exceeds the specifications in capacity, utilities and benefits.

WHAT TO INCLUDE IN THE SPECIFICATIONS

- **Description**

  Here is the tricky part! The description can make or break whether you get the item you desire. After reading all the descriptive literature for the item, you will notice that for each model number listed there are standard features that are provided as a part of that model number. There is no need to list features that are standard since the model number includes those features. Simply write after the model number "with all standard features."

  Select the add-on "accessories" or "extra features" that you wish to include with the item. Remember to read the specification sheet (or "cut" sheet) for the item carefully! Most manufacturers do not include as standard what you might think would be a "standard feature." After selecting the "extras" you desire, list those "extras" in detail, along with any selection of colors, sizes, finishes, etc., that must be made.

  Example: One (1) each convection oven; ABC Range Company Model Number 123-456-A or approved alternate that meets or exceeds the specifications in capacity, utilities and benefits. Provide with all standard features and the following:

  a. Four (4) 25" high stainless steel legs with adjustable stainless steel feet.
  b. Stainless steel left and right sides.
  c. Oven control package "E."

- **Electrical Requirements**

  List any electrical requirements for the item selected. This information appears on the manufacturer's literature. You should list the voltage, cycles (60 cycle current is standard in the U.S.) and phase as well as the electrical load. The electrical load will be in Amperes (Amps), Watts, Kilowatts, or Horsepower. Be sure when selecting voltages that the school where the item will be used has that voltage and phase available for use!

  Example: Electrical Requirements: 120 volt 60 cycle single phase @ 6.0 Amps.

- **Plumbing Requirements**

  List any plumbing requirements for the item selected. This information appears on the manufacturer's literature. You should list any hot water, cold water, drain(s), or gas requirements for the item. Along with the gas connection size should be listed the gas consumption of the equipment. The consumption will be shown on the literature as Btu/HR. Be sure that the school where the item will be used has the water, drains, and/or gas available for use!

  Example: Plumbing Requirements: 3/4" Gas @ 60,000 Btu/HR.

- **Steam Requirements**

  Steam operated equipment when connected to the building central steam system will require a steam supply and a steam condensate return. The literature will list the sizes of the connections and the steam pressure required. Pressure will be shown as pounds per square inch (PSI). Special pressure reducing valves are usually required and should be specified for proper operation. It is advisable to consult with experts before attempting to write specifications for direct connected steam equipment.

- **Mechanical Requirements**

  Mechanical requirements of equipment are those requiring ductwork connections for the purpose of venting. This would be equipment items like dishwasher condensate hoods, cooking equipment exhaust hoods, or clothes dryers. The duct connection size will appear on the specification along with the suggested air to be exhausted or supplied to the equipment. The exhaust or supply will be noted as cubic feet per minute (CFM) and static pressure (SP). Static pressure is amount of air resistance the equipment has and will be noted in inches, i.e., 10" x 30" duct connection for 3,200 CFM @ 3/4" S.P. It is advisable to consult with experts before attempting to write specifications for equipment with mechanical requirements. Ductwork and fans will usually be required for the proper operation of the equipment which will require other contractors to be involved.

- List here any special instructions to the bidders. Be specific in this part because if you don't list it, the odds are you won't get it!

  Example: Deliver, uncrate and set in place ready for the final connections by others.

A finished spec section for a convection oven based on the above guidelines should read like the following:

Provide: One (1) each convection oven; ABC Range Company Model Number 123-456-A or prior approved alternate that meets or exceeds the specifications in capacity, utilities and benefits. Provide with all standard features and the following:

a. Four (4) 25" high stainless steel legs with adjustable stainless steel feet.

b. Stainless steel left and right sides.

c. Stainless steel louvered rear panel.

d. Oven control package "E."

e. Electrical Requirements: 120 volt 60 cycle single phase @ 6.0 Amps.

f. Plumbing Requirements: 3/4" Gas @ 60,000 Btu/HR.

g. Deliver, uncrate and set in place ready for the final connections by others.

h. Deliver to Anytown High School, 123 Main Street, Anytown, AL 32000. Delivery must be on or before August 15th 19??. Call Ms. Jane Doe at (205) 123-4567 to coordinate delivery time and date.

i. Equipment supplier shall fully warrant this equipment, parts and labor, for a period of one (1) year from date of start-up.

j. At time of start-up, equipment supplier shall fully demonstrate the operation and maintenance of the equipment and provide three (3) operation and parts manuals.

WHAT TO ASK WHEN BUYING DIRECT

When the school district buys direct from the manufacturer, ask the following questions to make sure "all the bases are covered." Answers will probably come from school maintenance staff, food service employees and the equipment salesperson.

- ☐ Who will track down late or missing equipment?
- ☐ Who will schedule the delivery and who will receive the equipment?
- ☐ Who is responsible if the equipment arrives damaged?
- ☐ Does the voltage and phase match the electrical service at the school?
- ☐ Is the equipment properly fused?
- ☐ If it is "plug-in" equipment, does the plug shape match the plug available?
- ☐ Are the gas lines in the right location and are they adequate?
- ☐ Will gas, water, or steam pressure regulators be required?
- ☐ Are water filters or line strainers required?
- ☐ Does the equipment meet the state and local plumbing, electrical, mechanical, fire and health codes?
- ☐ Who will uncrate the equipment and set it in place?
- ☐ Will the equipment fit through the doors or openings at the school?
- ☐ Will special lifting equipment be required to get the equipment in the building?
- ☐ Is there proper clearance between equipment items? Some controls are heat sensitive and must have "breathing" clearance to operate properly.
- ☐ Can the equipment be serviced after it has been set in place?
- ☐ Who will service the equipment? How far away are they?
- ☐ Is any service included in price?
- ☐ Are spare parts available in case of a break-down?
- ☐ Are special tools required to accomplish the installation?
- ☐ Who will calibrate the thermostats or controls?
- ☐ Does the equipment require special lubrication before operation?
- ☐ Will the new equipment require a fire protection system?
- ☐ Who will initiate the warranty?
- ☐ Are there hidden packing materials that must be removed before hook-up?
- ☐ Who will clean and sanitize the equipment before initial usage? Fryers, griddles and tilting skillets require special cleaning.
- ☐ Who will install "loose" parts or accessories such as vacuum breakers, solenoid valves, water flow controls and starters?
- ☐ Who will demonstrate the proper operation and maintenance of the equipment?

A CHECKLIST: WHAT TO INCLUDE IN THE SPECS

- ☐ Quantities of each piece of equipment
- ☐ Required delivery dates (specify a range of dates)
- ☐ Provision for on-site adjustments by equipment supplier
- ☐ Required on-site demonstrations or training
- ☐ Seals of approval required on equipment (UL, NSF, AGA, etc.)
- ☐ Sizes and capacities of each piece of equipment
- ☐ Warranty requirements (minimum of one year)
- ☐ Always specify heavy duty (not restaurant weight) equipment
- ☐ Require continuing supply of replacement parts for the life of the equipment
- ☐ Service, including parts, shall be available within a reasonable distance from installation site in order to assure repair and restoration of operation within 48 hours after the manufacturer's designated service agency has been notified of breakdown.
- ☐ Include special features, finishes and options. Don't take for granted that a piece of equipment comes with certain necessities. If you need six racks in the oven, specify six racks in the oven.
- ☐ Electrical requirements (voltage, cord sets, amperage, etc.)
- ☐ Water, gas, and waste requirements
- ☐ Require operational and parts manual for all equipment provided (it is recommended that one copy go to the school with the equipment and that two additional copies of the manual go to the district food supervisors office).
- ☐ Consistent standards - make sure all models specified are indeed equal.
- ☐ Avoid fabricated equipment if a standard piece of equipment can serve the same purpose.
- ☐ Avoid painted finishes when possible to reduce maintenance costs. Stainless steel is the material of choice for most equipment (14 gauge for sinks, table tops, shelves, 16 gauge for side and top panels of equipment).
- ☐ Keep it as simple as possible to get the job done. "More buzzers and bells usually mean more service problems."
- ☐ Provide locking casters when possible. These allow easy cleaning and movement for repair and service.
- ☐ HVAC equipment shop drawings must indicate exhaust requirements in CFM, make-up air requirements(to hood) in CFM and in W.G, and heat rejected by refrigeration equipment.
- ☐ Plumbing equipment shop drawings must indicate gas flow rate, inlet gas pressure, drain sizes, and water pressure requirements.

7 - A FABLE

The local school board went back to HDL Associates to design an addition to the school. Bill was now a senior project architect and looked back fondly to his first big project at the firm. He would design the addition.

He ran into his first problem in trying to add to the food service areas. There had been a large number of problems that had surfaced over the years. These included parking in loading areas, poor access to the dumpster, and paths crossing in the serving area. And, of course, a major problem was that the cafeteria could not accommodate the student population. This problem was aggravated by the fact that the contractor had installed the wrong size seats and tables.

The original idea of putting the dining area in a central location and wrapping other spaces around it had seemed a brilliant one at the time but it had created a nightmare for the school staff and students. Noise from the dining area could be heard in the auditorium and library, and the school always looked messy because visitors, staff, and students had to enter and exit through it every day. All those food trays and students walking around! The big problem was finding the space to expand. The cafeteria was landlocked by other building spaces. Finally, Bill decided to use the existing auditorium space as the new cafeteria/ auditorium space and expand outwards from there. This left a large unusable lobby where the cafeteria had been, but he didn't really have a choice in the matter. Also, the structural engineer had not planned for an addition, so there were columns in the exterior walls that could not be moved without great cost. This split the new cafeteria into what was essentially two rooms so it couldn't be used as an auditorium after all. Therefore Bill had no choice but to put the dining area where the library used to be and close up a hallway to create kitchen access to the new area. This meant that food service workers couldn't see what was going on in the dining area.

Mrs. Rockwell saw the design for the cafeteria on March 22. She immediately went to see the principal.

the superintendent told the food service director to just be happy that she was getting a new cafeteria.

Both individuals talked with the Superintendent about the new cafeteria. Mr. Ramsey refused to discuss any changes with the architect. He told Mrs. Rockwell to be happy that she was getting a new cafeteria.

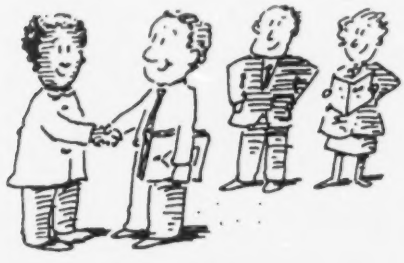
During the bid process, the school board made the decision to order the equipment separately to save on the architect's and contractor's fee. This decision led to an endless headache for the school. The equipment was ordered and received nine months before

the school was completed. It had to sit in storage during this time. The contractor claimed he was not responsible for coordinating the installation of the equipment since he didn't purchase it.

Once again, cafeteria employees had been given a facility that was substandard. Now, they were forced to make the cafeteria meet the needs of the student population.

June 1995

The Longwood School Board hired William Denkins & Associates, Architects to design the new Central High School. The owner of the small firm was Bill Denkins, formerly of HDL Associates. Bill's new firm was a small one and he would act as project architect for the new high school.



1995- Bill was determined to get this project right.

Bill had learned his lesson the hard way about food service facility design. HDL Associates had done a post-occupancy survey of Longwood Elementary School one year after the addition was completed. The staff had not been happy with the kitchen design. He was determined to get this project right!

Bill stressed to the board that a comprehensive education specification or building program should be drawn up for the new high school. He emphasized that the program should include plans for growth and expansion in realistic terms. Staff should be assigned to the school and then be part of the process for drawing up the educational plan.

Bill hired a food service design consultant and they sat down with the county food service director and Mrs. Rockwell to look over the program. The county director worked with the school staff and gave him a list of desires for the new facility based on the menu plan. She then took Bill to two other schools in the county that had well designed state-of-the-art kitchen facilities. Her staff told him about problems that other schools had and their desire to avoid these things.

The state food service program had just published a Handbook for food service design. Bill couldn't believe his good luck! In the past he had used generic information from other books in his office to design the kitchen and dining spaces. Now he had a Handbook specifically about school food service! No time would be wasted on this project reinventing the wheel...he could spend time improving it instead!

Bill got a call almost immediately from Mrs. Rockwell, the food service manager at the school, asking about some of the kitchen equipment provided. The dishwashing system was just the same as the model she had worked with the past ten years in the old middle school in Longwood. She had hoped for a newer model like the one she had seen at a recent convention but at least she knew how to operate it! She asked Bill how to operate the new fryer and ovens that had been installed. Bill said she would have to call the manufacturer as he certainly didn't know!

Mrs. Rockwell was furious. The manufacturers sent her brochures on the equipment but told her that any on-site instructions on equipment operation would be charged to the school as a service call.

Mrs. Rockwell was furious.

When she asked why this was not included in the equipment purchase, she was told the architect did not include instruction time or service in the specifications. In addition, the mixers for baked goods were much too large for the type of menus served at the school. What a waste, she thought, I could have used the extra money paid for these fancy mixers to buy another oven which is what I really need! And all these knobs and buzzers on the dishwashing equipment! Just one more thing to break! Also, the menus were based more and more on frozen food purchases but the freezer space just wasn't big enough to buy in bulk. She had to place orders for delivery three times a week which took time away from meal preparation and cost more money because she couldn't buy in bulk.

October 1979

Longwood's population had grown steadily in five years but much of the wealthier tax base lived south of the city. The elementary school had been built without central air conditioning and when the school board finally decided to allocate money to add air conditioning to the school, Mrs. Rockwell and the school principal convinced the board to put some money aside to update the kitchen facilities too.

Because money was tight, the school board hired a heating, ventilation and air conditioning (HVAC) contractor directly. This way they did not have to pay an architect's or engineer's fee. They also decided to buy the new ovens and additional freezer they desperately needed directly from the manufacturer for the same reason.

Mrs. Rockwell met with the sales representative for the ovens and freezers and chose what she wanted. The school custodian and maintenance staff said it would be no problem to install the equipment when it was delivered.

December 1979

When the HVAC contractor started to install the equipment he found he couldn't put a ventilation hood over the fryers and cooktops because some structural beams ran right through the roof at that point.

AN ADDITION IS PLANNED

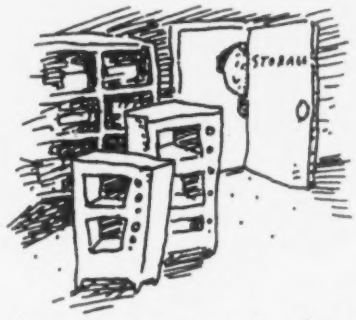
He moved the ventilation hood off center and cut one of the smaller beams to fit it in. The next morning he got a hysterical call from the school principal. A portion of the roof in the kitchen had collapsed from the load of the heavy HVAC equipment. When he heard what had happened, the superintendent called the original structural engineer on the project because no one at the school had a copy of the drawings from the building's construction in 1974.

December 1979 - a portion of the roof had collapsed.

The structural engineer said the roof beams were not designed to carry the heavy loads of an HVAC system and that the entire structure would have to be reinforced with more steel to allow the HVAC contractor to install the equipment. Meanwhile, half of the kitchen was unusable and the board had to allocate emergency funds to repair the damage and get the kitchen up and running before the end of the winter holidays.

The kitchen equipment was delivered two days before school was to reopen but the maintenance crew couldn't install the ovens because someone had ordered three phase electric ovens and the school electrical service was an old one that wouldn't accommodate this.

What a disaster!



the new ovens sat in storage.

The HVAC equipment sat outside the school for a year while the school board tried to find the money for the structural reinforcement of the roof and the new ovens sat in the rear storage room, unusable.

March 1987

Population was beginning to grow as Longwood was now a thriving center for technology and low impact industry. There was a continuous expansion process taking place in local government. Longwood's school system had experienced serious changes because of the population growth and the Longwood Elementary School was now serving 600 students when it had been designed for only 300. First graders were eating lunch at 9:30 am.

March 1987 - the school was now serving twice its designed capacity.

LONGWOOD BUILDS A NEW SCHOOL

Longwood is a small city in the southeast. It had originated as a sleepy little town along a trade route. Although it had seen rough times in the middle of this century, it had begun to make a name for itself as a city with a good quality of life and a growing business community. Population growth was beginning to place an increased demand on city services.

February 1972

The need for a new elementary school was apparent. The school board decided to build a new school on the site of the original Longwood Elementary School. This new facility would carry the name of the previous school.

February 1972 - the need for a new elementary school was apparent.

April 1972

HDL Associates was chosen as the architect for the Longwood Elementary School project. Their charge was to design a state-of-the-art facility for 300 students. Mr. Huey, a partner in the young firm, had decided to take an active role in the Longwood Elementary School project.

He set up a meeting with the superintendent and other school officials. During the meeting, Mr. Huey solicited ideas for the design of the new elementary school. There was not a food service representative present at the meeting. Superintendent Ramsey felt that there was no need to involve such an individual in the process. He had been involved in education for thirty years and felt he could provide all the necessary information to the architect and avoid a lot of confusion and fuss. The major concern of the group was adequate classroom facilities. Besides this, they pretty much left the decisions up to the architect.

July 1972

Bill Denkins was a young architect who had been with HDL Associates for two years. Mr. Huey chose Bill to be the project architect from his firm. This was the first big project that he was given.

Based on his meetings with the superintendent, Mr. Huey told Bill what was needed in the new school. Bill spent a lot of time designing the classrooms and how the building would look from the exterior. He also got a great new idea for a school plan from a current architecture magazine.

July 1972 - Bill got a great new idea.

He put the cafeteria in the middle of the school and surrounded it with the auditorium, library, administration offices and entry so that it became a kind of community center to the school. Just like the kitchen/dining room at home was the place everyone seemed to want to be when he was growing up in his mom and dad's house.

HDL Associates had never done a school building before so Bill called some salesmen listed in the phone book and met with them about the kitchen and cafeteria design. He was amazed at how eager they were to help. They even provided plans and layouts of kitchen equipment and dining seating. Two salesmen gave Bill a copy of written specifications for the kitchen equipment. Bill didn't understand all the equipment lingo but he combined the specifications and put them into the bid package. The specs looked very complete and professional.

September 1972

Mr. Huey and Bill presented the final drawings of the school to the local community and school board at a special meeting. Because this was a new school, staff had not been assigned to it yet, but the community and school board were enthusiastic about the building. They gave the go-ahead to put the plans out for bid.

January 1973

During the bidding, Bill got calls from all the contractors about the kitchen equipment plans and specifications. It seemed the equipment he had listed as equal was actually quite different and many contractors wanted to substitute other equipment. Bill got nervous and asked the contractors to submit information on the equipment they wished to substitute.

January 1973 - he really had no choice now but to approve the cheaper equipment.

It took Bill almost a week to compare the equipment with what he had specified. It turned out he had specified lots of different levels of quality for each equipment type and he really had no choice now but to approve the cheaper equipment as equal. Oh well, the kitchen staff would be happy with whatever they got because it would be brand new!

January 1974

The construction of Longwood Elementary School was completed, staff was assigned, and it opened for the spring term of 1974.

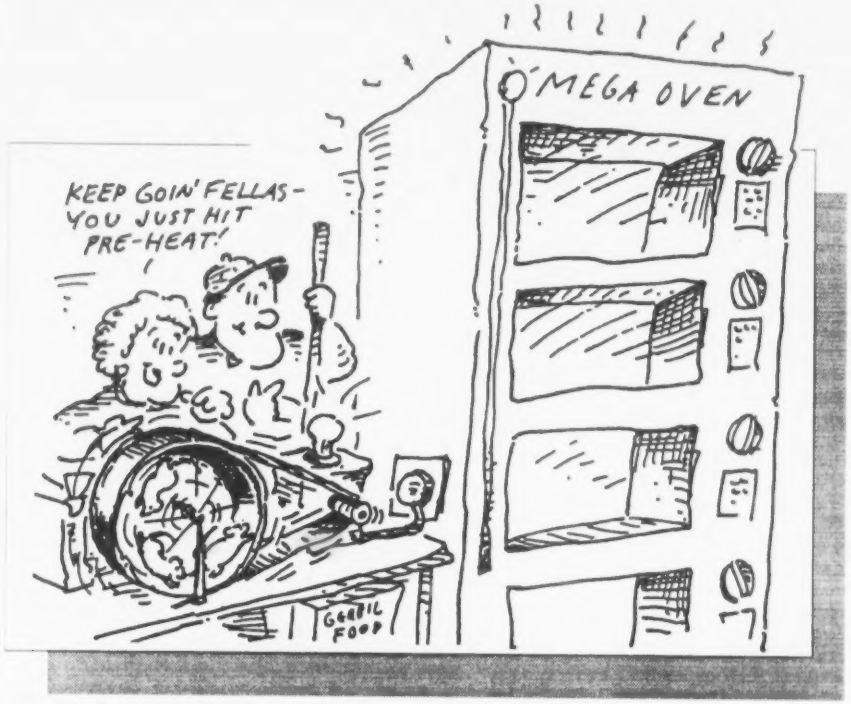
January 1974 - the construction was completed.

BEST COPY AVAILABLE

WHY CALL THE PROFESSIONALS?

Well by now you know what the State laws say you should do. But what are some other reasons you should call the professionals before starting any renovation project?

We can start with some "believe it or not" stories of things that have happened when professionals weren't called:



- Electrical service was not verified and equipment was purchased that required either a lot of electrical power, power that was not available, or there was no space in the existing electrical panel box. All three situations have happened.
- Equipment has been purchased which required part of it to be mounted on the roof, such as hood vent exhaust fan. The structure was such that it could not handle the additional weight without being modified. This created problems because no funds were available to make structural modifications to the school building.
- A piece of equipment was purchased which required gas service; gas was not available at the school and could not be easily obtained.
- Equipment has been purchased which added a lot of heat to the kitchen area and the existing HVAC could not adequately cool the space in the warmest months.

WHEN TO CALL THE PROFESSIONALS

Renovating food service spaces can be one of the most costly and complicated of building and planning tasks in schools. Kitchen equipment is expensive! A good rule of thumb is that unless the renovations involve only the purchase of replacement equipment that is furnished with a cord and plug, a member of the design team should be consulted.

There are basically three levels of renovation that you might be considering:

- ***New equipment only.*** *No building construction is required here and generally a member of the design team is not consulted. The wrong equipment selection can lead to very costly results.*
- ***Minor renovation to an existing facility.*** *This work can be performed with little or no interruption to the existing operation.*
- ***Major renovation to an existing facility.*** *This work requires total shut down of the facility in order to accomplish the work.*

LOCATE EXISTING DRAWINGS

Architectural drawings are of great value in giving you information about the exising facility to be renovated. It is very important that you find these drawings. Locate these either in the school files, district maintenance office or local building department office. If none of these locations has a set of drawings for your school, call the architect of the original building. Architects keep a set of drawings for all projects they have done.

Now that this has been said, we should caution you that not all architectural drawings will be accurate. Don't ever order a piece of equipment or tear down a wall without verifying the drawing information. Field conditions very often differ from the drawings, and changes during construction are not uncommon. Therefore, before any work is done or equipment ordered, verify existing measurements and engineering work.

And given all this, we will tell you to never lend drawings out when the renovation project is done. Never, ever, for any reason lend drawings. If a contractor needs a set to give you an estimate, the custodian or principal in charge of these documents should send them out to a copy shop to be duplicated. Give the copies to whomever is requesting them. And never give a contractor "just a few sheets". Drawings get lost very easily this way - never to be seen again.

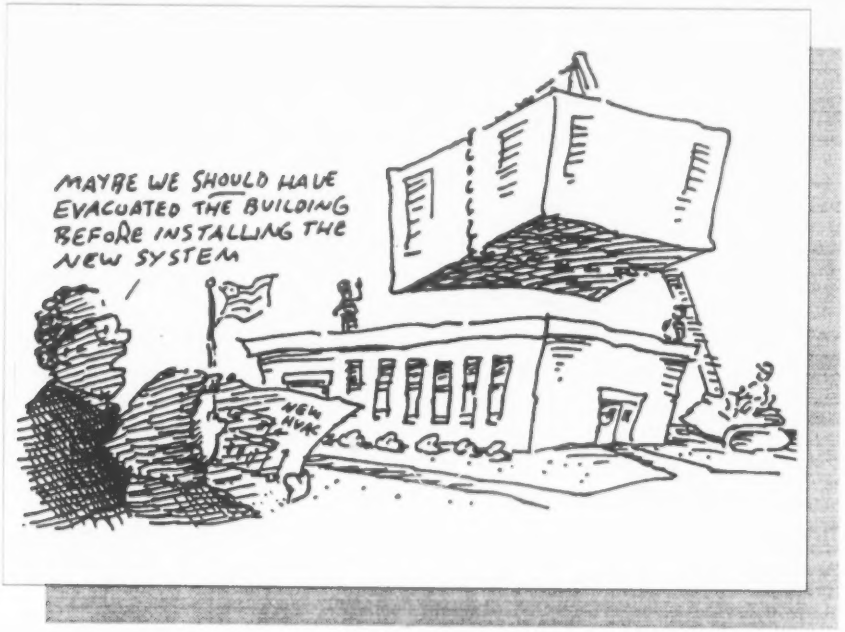
PLANNING FOR FLEXIBILITY

If you are renovating a food service space, chances are you will need to make an addition to this space somewhere down the road. What you do during your renovation can make it easier (less costly) or harder (more expensive) when that time comes. If you don't think it is likely that you will be adding on, you will probably be doing another renovation in the future and should at least keep this in mind

Because food service areas are highly engineered and designed spaces (and by this we mean they have a lot of electrical, mechanical and plumbing work in them), they are very costly to renovate and add on to. If you take the following suggestions to heart you can make any future work easier.

- **Look for flexibility in equipment:** In minor renovations that involve only equipment replacement, remember to purchase equipment that is flexible in use. Don't lock yourself into an equipment layout in the kitchen or specific serving pieces that can't be changed if the menu changes. Flexibility in equipment usage and layout will save you money in the long run...even if you have to pay a little more now.
- **Leave room to grow in the electrical service:** When undertaking a major renovation, the electrical system should be designed for future growth. All electrical panels that feed equipment in the kitchen should be sized with at least 25% spare capacity. This may need to be more if extensive future growth is anticipated. Whatever the case, this should be evaluated by the electrical engineer during the design phase. It is much more expensive to add electrical service than to design the capacity into the system at the beginning.
- **Locate utilities out of the path of growth:** Attention should be paid to the location of electrical panels. They should not be located on walls that would most likely be removed if renovation were to occur. It would be impossible to know exactly what would be done in the future, but it would be helpful if some evaluation could be done to determine the most likely renovation/addition routes.
- **Locate mechanical equipment out of the path of construction/growth:** Planning for flexibility involves location of equipment. Avoid locating air handling equipment, condensing units etc., in areas that will be affected by construction. Avoid locating water heaters, gas meters, grease interceptors, etc., in the path of growth.
- **Size kitchen and mechanical equipment to be flexible:** Modular sized air handlers in the 10 to 20 ton range are adaptable to several different services such as dining, food preparation and holding. Avoid one large air handler as it will be less flexible.
- **When renovating a facility select a direction that the kitchen can grow without abandoning all the kitchen plumbing.** This is not a cost effective method for renovating or adding kitchen space.
- **Do not displace the kitchen by converting it to dining.** Again, all of that plumbing and electrical cost quite a bit of money! Save it and work with it as best you can.

In renovations, to call a structural engineer after the fact could mean that permanent damage may have already been done. The structure is designed for its original intended use. Codes change and the original mechanical and equipment loads may require more support capacity than before. Make sure that the structural engineer is involved at the beginning to verify that the renovation ideas can work within the building's structural capacity or that the modifications to the structure are reasonably budgeted and considered.



OTHER STRUCTURAL ISSUES

- **The main structural question to be answered is, "can the new loads added to the building be safely supported by the existing structure?"** If additional load capacity is required, knowing its cost and impact on the renovation should be established. The loads that must be considered are the following:

  Roof loads: these are normally the minimum required to support new equipment loads such as hoods, exhaust fans and air conditioning equipment.

  Floor loads: normal live loads for classrooms are 40 pounds per square foot (psf). Kitchen live loads can be almost twice as much (80 psf). Adding finishes to rough floors (such as a concrete topping and thick set ceramic or quarry tiles) to create slopes to drains should be carefully reviewed. New storage areas can add a much higher floor load to a facility.

Equipment loads: new kitchen and mechanical equipment will add or change the loads on the floor and roof . If the kitchen floor is a concrete slab on grade (solid ground), there should be little concern about normal kitchen equipment loads. However, **if equipment is supported from a framed floor which is not a concrete slab on grade, or if equipment is supported by the roof, the structural capacity should be verified before the equipment is installed.** This consideration should be made regardless of who installs the equipment.

- Kitchen renovations normally require new openings, in the floor and/or roof, as well as, through existing walls. These openings may be for new doors, mechanical duct penetrations, etc. **Take care when cutting into the existing structure!** You must know if the wall you are cutting through is a bearing wall or a partition and what type of support, if any, is needed.
- **Obtain the architectural/structural drawings for your facility.** Without them, the structural reviews and investigations may involve upgrading a structure that is already adequate. Hire a structural engineer for an evaluation. It is money well spent. It is difficult and sometimes impossible to determine the structural sizes in a building to establish its capacity (i.e., foundations). Foundations are not accessible or visible once the building is constructed. Making assumptions that the structure can carry new loads is dangerous - call a professional.

THE ELECTRICAL

The electrical system in a typical kitchen is complicated and extensive. In renovations, **verify existing electrical service available before any equipment is ordered and even before major decisions are made so that equipment can be properly specified.** The three main questions to ask regarding the existing electrical service are:

- ***Is adequate power available for the new equipment?***
- ***Is the power that is available for the new equipment the right type of power?***
- ***Is there space in the existing electrical panel box to make connections for the new equipment wiring?***

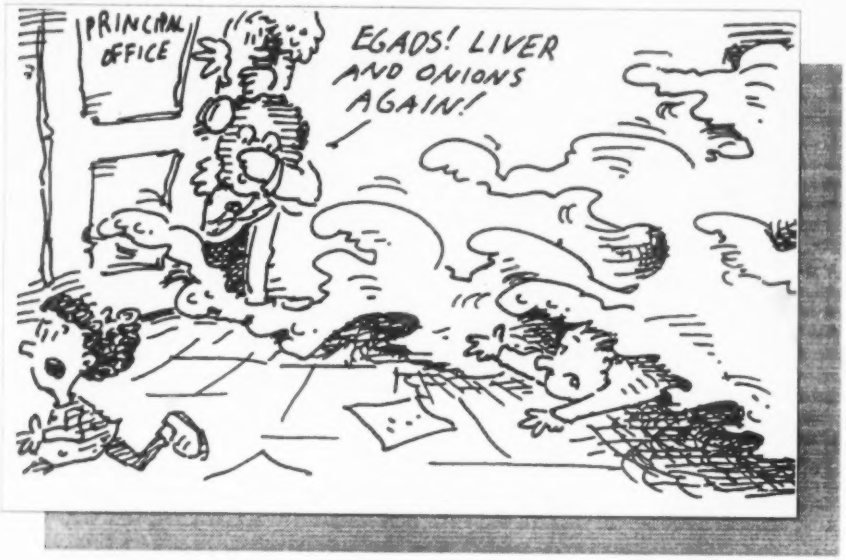
Remember that as is the case with the structure of the building, building codes may have changed since the facility was built. Most utility companies will evaluate existing conditions and assist the school in determining how much capacity is available on the existing electrical system before the school buys equipment. This is especially helpful for small schools and/or small budget renovations. Take advantage of this service.

As a rule, replacing one piece of equipment will not normally require any engineering. However, a new modern piece of equipment may have features which didn't exist 20 years ago, such as auxillary make-up air on exhaust hoods. These features may require some engineering and additional equipment purchases that were not part of the original project budget. This is why it is so important to do this facility evaluation in the very beginning of the project. The fewer surprises (especially those involving money) the better.

OTHER ELECTRICAL ISSUES

- **Keep in mind that it can be very costly to relocate electrical panels and associated equipment.** If at all possible the renovated space should plan to leave panels in their existing location.
- **If the existing building has been in use for some time, it may be time to think about changing out existing lighting in the food service area if the budget will permit.** New fixtures on the market offer more energy efficient choices than were available several years ago. Choose new lighting systems that are energy efficient and easily maintained. Lighting should also be somewhat vandal resistant in areas where students will be.
- **Provide at least 25% spare capacity in the panels serving the kitchen area.**
- **Locate panels in walls that will most likely not be removed during a renovation or addition.**
- **All electrical equipment and devices should be of a good commercial quality.**

Mechanical and plumbing are very difficult to change or add on to. Renovations usually involve a growth in service or square footage. The tendency is to patch and add mechanical service such as ventilation in a haphazard manner which often leads to inadequate ventilation in the kitchen.



OTHER MECHANICAL AND PLUMBING ISSUES

- It is difficult to expand mechanical systems - especially grease hoods. Grease hoods are usually sized for a specific application, they are UL listed, and there isn't any room to grow with a given system. Air handlers can be supplemented by adding additional air handlers. Water heaters can be added in parallel.
- Plumbing lines are very often set in a concrete slab floor. This makes it difficult to add additional service without tearing out concrete (Doesn't sound like fun does it?) and a major expense. For these reasons, try to work with existing plumbing lines whenever possible.
- Obtaining the architectural and mechanical drawings for the building will help determine sizes of existing lines and locations (Be careful here - things are not always installed where the drawings say they should be).
- Utility services in many cases will need to be run separately outdoors and then be joined together (water, gas, and sewer).
- Check existing air handling systems and equipment to see if they meet present building codes.
- Ask if the existing systems are able to provide adequate cooling and heating. Also evaluate the condition of the equipment. A rooftop unit has an expected life span of between 10 and 14 years.
- Verify that the natural gas service is adequate (pressure and flow) to meet new requirements. Local utility companies may be helpful here.

RENOVATIONS CHECKLIST

- ☐ Complete "Getting Started" Facility Data Sheet in Chapter 3.
- ☐ Obtain set of architectural drawings (including structural, mechanical, and electrical).
- ☐ Verify information shown on existing drawings such as dimensions, utility locations, etc.
- ☐ Call a structural engineer if you are adding equipment to the roof or a framed floor or if you are cutting openings in walls, floors or the roof.
- ☐ Determine if shut-down of facility is required and how this will affect school.
- ☐ Make a list of equipment that will remain, will be removed and will be ordered.
- ☐ Who will buy equipment? Answer questions on page 3-20.
- ☐ Do existing systems meet present building codes and health department regulations? What up-grading must be done to comply with new laws?
- ☐ Is the equipment selected for purchase flexible in usage in the future?
- ☐ Contact electrical utility company to assist in evaluating the existing electrical service.
- ☐ Is natural gas service adequate in pressure and flow to meet new requirements?
- ☐ Review plumbing riser or plan sheets indicating connected fixture units or flow.
- ☐ Decide on a path of future growth if possible. Can utilities be located away from this?
- ☐ Can mechanical systems and equipment installations be located away from path of future growth?
- ☐ Will new equipment add significant heat load to the kitchen?
- ☐ Will mechanical systems be able to provide adequate cooling and heating?
- ☐ Has 25% spare capacity been provided in electrical panel box?
- ☐ Can existing electrical panel box be left in place (to save money)?
- ☐ Evaluate existing lighting. Is it energy efficient?
- ☐ Complete Health Department Checklist in Chapter 3.
- ☐ Complete Checklist for Facility Completeness.
- ☐ Are the supply ducts lined? If so, removal is recommended.
- ☐ Verify that the capacity of water heaters is adequate to serve new equipment.
- ☐ Are the sanitary sewers deep enough to extend? Review inverts of plumbing piping below floor.
- ☐ Is the grease separator adequately sized? Is the separator located to serve the kitchen properly (to meet code)?

WHEN TO CALL THE PROFESSIONALS

*According to laws in many states, the services of an architect registered to practice in the state **shall be required for the design of all new structures, additions, and/or renovations or alterations to existing structures, and adjacent work. The services to be provided by an architect usually include what are commonly termed "basic services," consisting of the schematic and design development, construction documents, bidding and award, and construction administration of the project. If the project is engineering in nature, an architect is usually not required if the services of a professional engineer are used.***

You know all the legal requirements regarding additions, but what are some other reasons you should call the professionals before you even begin to budget for an addition?

Existing buildings have conditions which impact all members of the design team from the very start of an addition project. The existing plumbing lines and drains may need to be relocated to allow installation of new foundations. Many times unforeseen conditions are discovered after construction of the addition has begun. This is not unusual and some "surprises" should be anticipated.

It should be noted that although the Architect is the lead and directs the team, forty to sixty percent of the decisions he/she makes are directed by the advice from the engineering consultants. The sooner the total team is assembled and involved, the sooner many potential problems can be resolved.

If this doesn't convince you, we have some "believe it or not" stories illustrating things that have happened when professionals weren't called or were called too late:

- Water heaters and the electrical control panels for the entire school were installed in the kitchen storage rooms. The water heater and the air conditioner worked against one another the whole time and the panels took up one whole wall of potential storage space.
- Electric conduit was installed in the middle of the doorway. Electric conduit was installed in the middle of the hallway floor.
- Drains systems were laid to attempt to flow uphill. No pumping or lift system was considered.
- Bathrooms were built in the middle of the dining area. Bathrooms were built in the middle of the kitchen.
- Electrical outlets were installed on one wall of the kitchen only, while the water supply was on the other side only (the drains were in the middle).

THINGS TO THINK ABOUT

Adding on to food service spaces can be costly and complicated. This is because kitchen equipment is expensive and there is quite a bit of electrical and mechanical and plumbing work in the kitchen area. New construction is generally easier to plan because you are basically starting with a "clean slate." When you add on to existing spaces, a lot of coordination is necessary with existing conditions. This can be time consuming and frustrating.

There are basically two types of addition work you might be considering:

- ***Minor addition to an existing facility.** This work can be performed with little or no interruption to the existing operation.*
- ***Major addition to an existing facility.** This work requires total shut down of the facility in order to accomplish the work.*

If operations in the school are not to be interrupted, sequencing of the structural modifications will need to be evaluated very carefully. Scheduling becomes very important and phasing of the work must not interrupt kitchen service if construction is performed when school is in session.

The Americans with Disabilities Act must be complied with for everything that is done in the facility. It can't be ignored.

LOCATING EXISTING DRAWINGS

Architectural drawings are of great value in giving you information about the existing facility to be added on to. To make the addition go as smoothly as possible locate the existing drawings. These may be found either in the school files, district maintenance office or local building department office. If none of these locations has a set of drawings for your school, call the architect of the original building. Architects keep a set of drawings for all projects they have done.

Now that this has been said, we should caution you that not all architectural drawings will be accurate. Don't ever order a piece of equipment or tear down a wall without verifying the drawing information. Field conditions very often differ from the drawings and changes during construction are not uncommon. Therefore, before any work is done or equipment ordered, verify existing measurements and engineering work.

And given all this, we will tell you to never lend drawings out when the addition project is done. Never, ever, for any reason lend drawings. If a contractor needs a set to give you an estimate, the custodian or principal in charge of these documents should send them out to a copy shop to be duplicated. Give the copies to whomever is requesting them. And never give a contractor "just a few sheets." Drawings get lost very easily this way - never to be seen again.

PLANNING FOR FLEXIBILITY

Because food service areas are highly engineered and designed spaces (and by this we mean they have a lot of electrical, mechanical and plumbing work in them) they are very costly to make additions to. If you take the following suggestions to heart you can make any future work easier.

First, you can plan for flexibility both in your current addition project and for the future (The facility may grow again in 10 years!). Make no mistake, building flexibility in can add to construction cost but it may be worth it in the long run. Defining the desired flexibility and associated cost allows you an opportunity to evaluate the options. Here are some things you should consider seriously when planning an addition:

- **Remember to purchase equipment that is flexible in use.** Don't lock yourself into an equipment layout in the kitchen or specific serving pieces that can't be changed if the menu changes. Flexibility in equipment usage and layout will save you money in the long run...even if you have to pay a little more now.
- When undertaking an addition, the electrical system should be designed for future growth. **All electrical panels that feed equipment in the kitchen should be sized with at least 25% spare capacity.** This may need to be more if extensive future growth is anticipated. Whatever the case, this should be evaluated by the electrical engineer during the design phase. It is much more expensive to add electrical service than to design the capacity into the system at the beginning.
- **Attention should be paid to the location of electrical panels.** They should not be located on walls that would most likely be removed if renovation were to occur. It would be impossible to know exactly what would be done in the future, but it would be helpful if some evaluation could be done to determine the most likely renovation/addition routes.
- Planning for flexibility involves location of equipment. **Avoid locating air handling equipment, condensing units etc., in areas that will be affected by construction.**
- **Avoid one large air handler as it will be less flexible.** Modular sized air handlers in the 10 to 20 ton range are adaptable to several different services such as dining, food preparation, and holding.
- **Avoid locating water heaters, gas meters, grease interceptors, etc., in the path of growth.**
- When renovating a facility select a direction that the kitchen can grow without abandoning all the kitchen plumbing. Abandoning expensive plumbing is not a cost effective method for adding kitchen space.
- Do not displace the kitchen by converting it to dining or some other use. Again, all of that plumbing and electrical work cost quite bit of money! Save it and work with it as best you can.

The structural engineer should be involved from the very beginning of the project. Evaluation of the existing facility to accommodate the addition is the first item of business. Many times simple modifications to an addition, without impacting the function, can be made to allow simpler and less costly structural approaches to the design. An early evaluation will also verify that the addition ideas can work within the building's structural capacity or that the modifications to the structure are reasonably budgeted and considered. All buildings are designed for a purpose or intended use. Codes change and the original mechanical or equipment loads may require more support capacity than before.

OTHER STRUCTURAL ISSUES

- **The first structural consideration for an addition is to determine if the existing facility was designed for the addition.** The original facilities' drawings should identify any future addition anticipated in the original design. It is difficult and sometimes impossible to determine the structural sizes in a building to establish its capacity (i.e., foundations). Foundations are not accessible or visible once the building is constructed.
- **The next step is to evaluate how much, if any, of the addition will require support from the existing facility.** There may be occasions that the existing structure may be able to support some additional loads even though it was not originally designed for the addition. Keep in mind that codes change, many times providing improved properties of materials, allowing more capacity; however, sometimes it does not.
- **Structurally the balance of the design is a combination of a renovation and new construction.**

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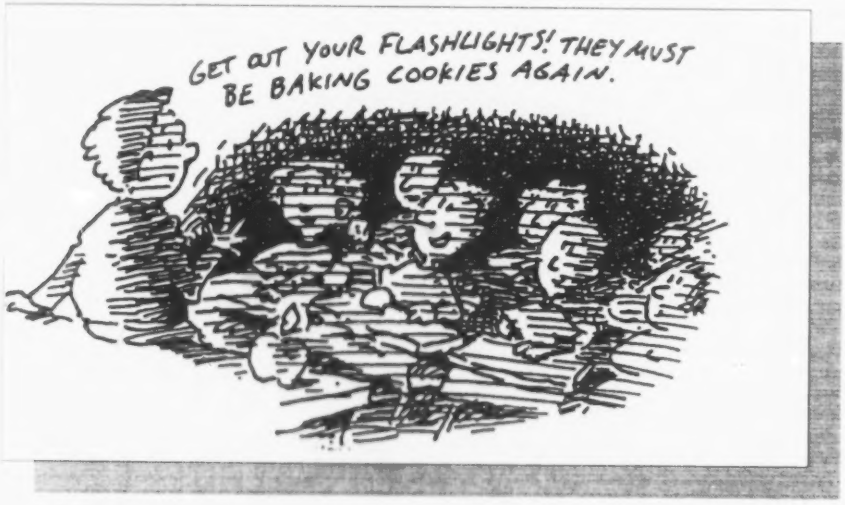
The electrical system in a typical kitchen is complicated and extensive. Keep in mind that it can be very costly to relocate electrical panels and associated equipment for an addition. If at all possible, the renovated space should be planned so as to leave panels in their existing location.

Call the electrical engineer to verify what existing electrical service is available before any equipment is ordered and even before major decisions are made so that equipment can be properly specified.



OTHER ELECTRICAL ISSUES

- **Keep in mind that it can be very costly to relocate electrical panels and associated equipment.** If at all possible, the addition should be planned so as to leave panels in their existing location.
- **If the existing building has been in use for some time, it may be time to think about changing out existing lighting in the food service area if the budget will permit.** New fixtures on the market offer more energy efficient choices than were available several years ago. Choose lighting systems that are energy efficient and easily maintained. Lighting should also be somewhat vandal resistant in areas where students will be.
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OTHER MECHANICAL AND PLUMBING ISSUES

- It is difficult to expand mechanical systems - especially grease hoods. Grease hoods are usually sized for a specific application, they are UL listed, and there isn't any room to grow with a given system. Air handlers can be supplemented by adding additional air handlers. Water heaters can be added in parallel.
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- Obtaining the architectural and mechanical drawings for the building will help determine sizes of existing lines and locations (Be careful here - things are not always installed where the drawings say they should be).
- Utility services in many cases will need to be run separately outdoors and then be joined together (water, gas and sewer).
- Check existing air handling systems and equipment to see if they meet present building codes.
- Ask if the existing systems are able to provide adequate cooling and heating. Also evaluate the condition of the equipment. A rooftop unit has an expected life span of between 10 and 14 years.
- Verify that the natural gas service is adequate (pressure and flow) to meet new requirements. Local utility companies may be helpful here.

ADDITIONS CHECKLIST

- ☐ Complete "Getting Started" Facility Data Sheet in Chapter 3.
- ☐ Assemble the project team.
- ☐ Determine if shut-down of facility is required and how this will affect school.
- ☐ Make a list of equipment that will remain, will be removed, and will be ordered.
- ☐ Who will buy equipment? Answer questions on page 3-20.
- ☐ Do existing systems meet present building codes and health department regulations? What up-grading must be done to comply with new laws?
- ☐ Is the equipment selected for purchase flexible in usage in the future?
- ☐ Verify existing electrical service.
- ☐ Is natural gas service adequate in pressure and flow to meet new requirements?
- ☐ Review plumbing riser or plan sheets indicating connected fixture units or flow.
- ☐ Can utilities be located away from path of growth?
- ☐ Can mechanical systems and equipment installations be located away from path of growth?
- ☐ Will new equipment add significant heat load to the kitchen?
- ☐ Will mechanical systems be able to provide adequate cooling and heating?
- ☐ Has 25% spare capacity been provided in electrical panel box?
- ☐ Can existing electrical panel box be left in place (to save money)?
- ☐ Evaluate existing lighting. Is it energy efficient?
- ☐ Review Health Department Checklist in Chapter 3.
- ☐ Complete Checklist for Facility Completeness.
- ☐ Are the supply ducts lined? If so, removal is recommended.
- ☐ Verify that the capacity of water heaters is adequate to serve new equipment.
- ☐ Are the sanitary sewers deep enough to extend? Review inverts of plumbing piping below floor.
- ☐ Is the grease separator adequately sized? Is the separator located to serve the kitchen properly (to meet code)?

THINGS TO THINK ABOUT

In new construction you start with a clean slate. You have the opportunity to take advantage of all the suggestions this Handbook has to offer. In addition, some things can be considered during the programming and design phases of the project that will not only make the construction go more smoothly but will make any future work (renovations and additions) on the food service area much easier and less expensive.

START THE PROJECT OFF ON THE RIGHT FOOT!

Read Chapter 2 regarding Planning and the Team. The success of the project will depend in large part on the owner or client identifying needs clearly to the design team. It is often difficult to state what is wanted when the choices are many. **It may help to make a list of what is not wanted**. Visit other schools and discuss what you like and/or dislike about the food service facilities. Make a list and present it to the architect. Keep a copy and refer back to it when evaluating the designs for the new construction. It will help you keep things in perspective and will aid the architect in achieving your goals.

Chap 2

Consider the following things when planning and designing a new school:

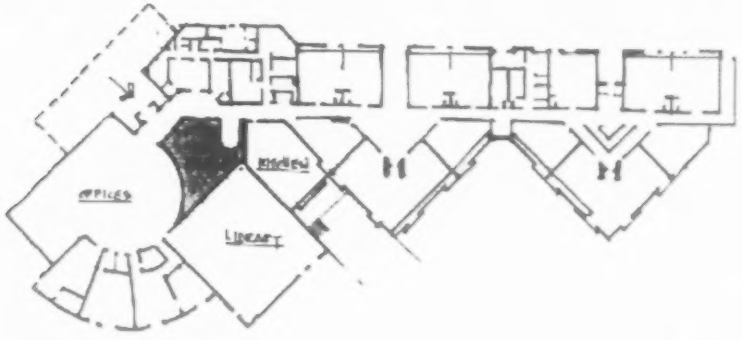
- What is the best location for food service in the building?
- How can the food service spaces be as flexible as possible?
- How to can future expansion be planned into the new construction now?
- What are the trends in food service?

When the project is complete have as-built drawings provided for all new and renovated construction by the contractor. The minor field modifications and relocation of any plumbing, electrical and mechanical work during construction can play a major role in additions and renovations done at a later date. Keep a set of drawings with school maintenance personnel and another set in the principal's office. Never, never, let the original as- built drawings out of your sight. They will be extremely important if you do renovations or make an addition in the future.

LOCATION FOR FOOD SERVICE IN THE SCHOOL

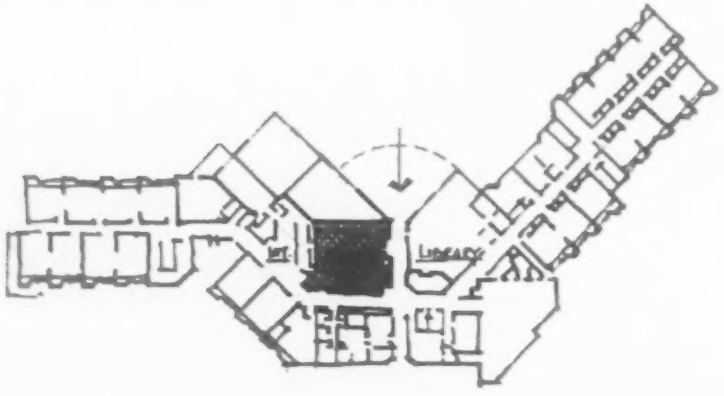
Where does the cafeteria and kitchen go in the new building? There are lots of things to take into consideration. To illustrate some of these issues, we have created some theoretical school plans showing the results of food service placement within the school. Some considerations about location should be:

SHOULD THE DINING AREA BE CENTRALLY LOCATED?



Here, the dining area is not enclosed with walls and is directly visible as people walk in the school front doors. It is not good to generalize, but dining areas contain a lot of people, noise and visual clutter (trays, food, dining furniture, people moving, etc.) and they are also large spaces that look rather forlorn when no one is using them. When they are open to the rest of the school and across from the administrative offices like this, it will not always give the best first impression when entering the school. In addition, this dining area is adjacent to the library and allows no room for future expansion.

DO THE DINING AND KITCHEN HAVE NATURAL LIGHTING?



This school has no provisions for natural lighting (windows) in the kitchen or dining areas. What results is a very large cave for a dining area (would you like a windowless dining room at home) and a dark kitchen area which isn't the nicest atmosphere to be working in everyday. Again, the dining is adjacent to the library which might be disturbing because of noise transmission.

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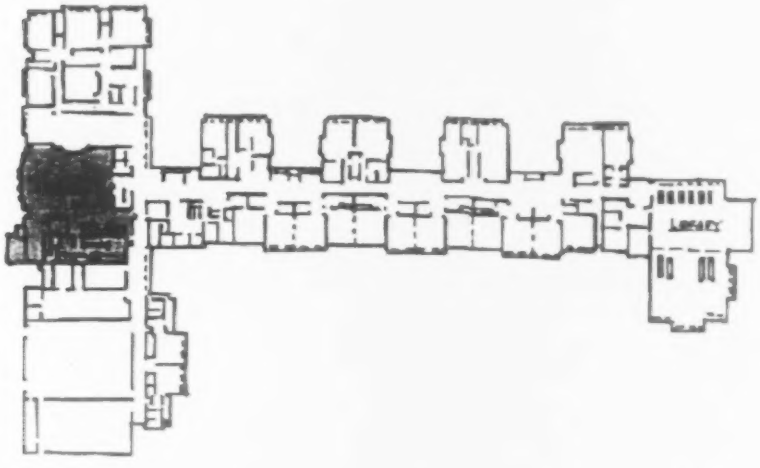
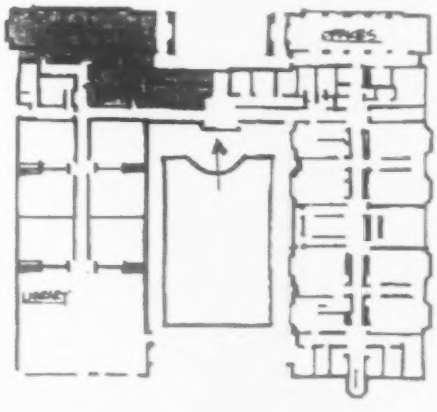
WILL NOISE FROM DINING AND KITCHEN BE DISTURBING?



Looking at extremes, this school separates food service and the library at opposite ends of a long hallway. This ensures there will be no disturbance caused by noise from the kitchen or dining areas to users of the library . Food service is also grouped with other loud activities such as the wood shop. In addition, this school dining area has a full wall of windows to let in natural light and offer a view.



This school also separates the library and food service while providing lots of natural light to the students in the dining area.

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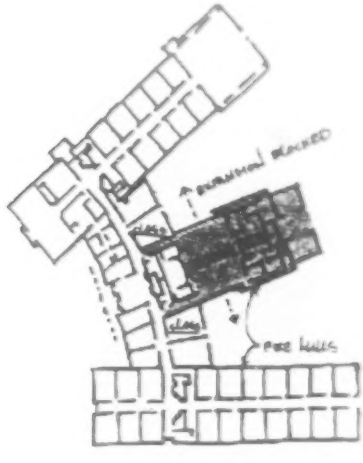
PLANNING FOR FUTURE GROWTH

You should provide for future growth in the facility right from the start because kitchens are so difficult and expensive to add on to.

How do you design for future growth?

- **Provide additional square footage from the start for kitchen and dining expansion.** If the school has limited resources to overbuild in square footage from the start, at least place equipment and mechanical/electrical services in locations that will make it easier to add on to the food service areas at a future date.
- **Locate load bearing walls and columns to make adding to the facility at a later date simpler and less expensive.** This will mean looking into your crystal ball and attempting to anticipate how the facility will grow. The structure is normally considered the most permanent component of the building. Mechanical ducts can be moved, interior non-load bearing partitions can be relocated, lights can be shifted, but the structure does not change. Normally, columns and foundations are not relocated, roofs are not raised and floors are not lowered.

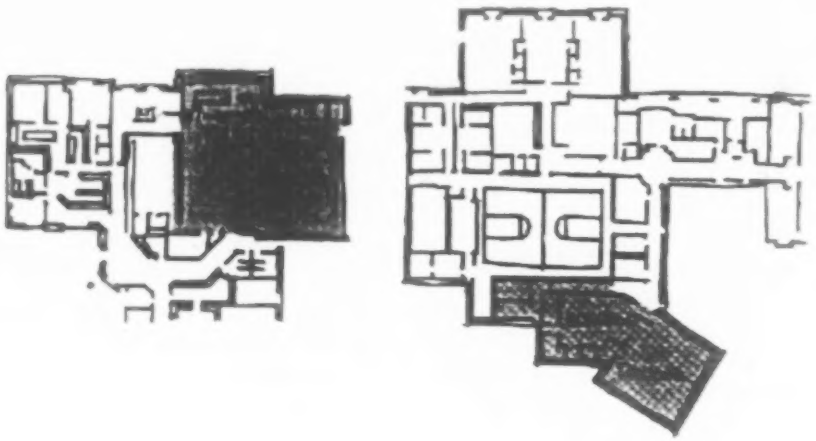
  Structural flexibility is normally built into the facility at the beginning. Minor changes such as new roof openings can normally be accommodated easily. Relocating a column is not impossible, but neither is it easy. Generally what is easy to do is generally affordable. Planning the structure is essential to accommodate anticipated present and future function of the facility. This planning should include the possibility of any additions that can be financially acceptable.
- **Anticipate building code issues that may surface when trying to expand a facility at a later date.**



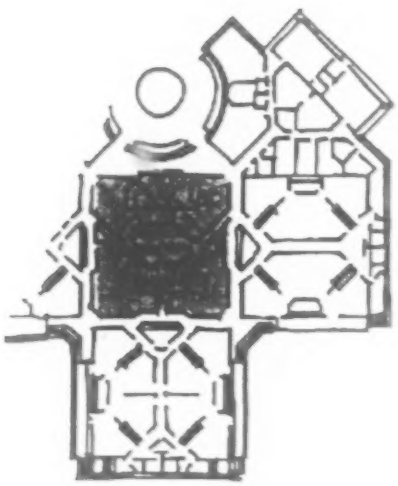
The plan above seems to indicate that there is plenty of room to expand the dining area sideways if more space is needed but in fact an expansion would cover windows in the classrooms to either side of the stage. In addition, the building code has requirements regarding fire ratings of the walls of an assembly space

(the dining area) and these may be too close to the classroom walls if the facility were expanded.

- **Leave plenty of room to expand the kitchen and the dining areas.** Don't "land-lock" either space. The result might mean that the kitchen and dining would have to move to an entirely new location in the situation of an addition...not a cheap proposition by any means.



The two plans above show school food service facilities that would be fairly easy to make additions to in the future.



This kitchen and dining area are land-locked (no natural lighting either!). It would be very difficult to add onto the dining and kitchen areas without relocating them or the spaces around them to a new location in the building.

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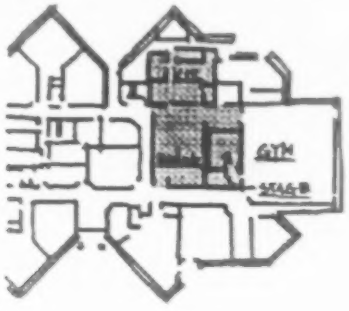
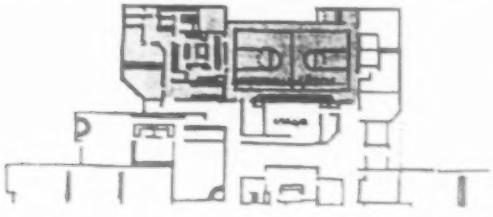
Gone are the days when the cafeteria was used exclusively for students eating lunch. Today, the food service area responds to trends which include multi-use rooms (cafetoriums) and dining areas that are used by the public. How should these uses be taken into consideration when planning and designing a new facility?

THE DINING AREA AS CAFETORIUM/GYMNASIUM

Because the dining area is not used all day and because a school auditorium is usually not needed during lunchtime, many schools find it more economical to combine these two spaces into a cafetorium. Some of these spaces are also used as a gymnasium. Below are shown two schools that have a cafetorium. This first school has a cafetorium and gymnasium separated by a common stage so that either room can use it.



The school below combines all three functions into one large space. Large areas of glass would be nice for the dining but are not practical for use in the gym so there are no windows. This produces a very large cave-like area for dining.



ACCESSIBILITY OF DINING AREA DURING NON-SCHOOL HOURS

Schools are becoming more public oriented. For many small communities in particular, the school dining area offers the only large gathering place in town. Opening the doors to the community after school hours encourages good will and more participation and interest on the part of the public.

Remember that accessibility should include toilets and well-lit parking . The decision to open the kitchen and loading docks to outside groups is one that must be made by the local school or school board. This too will affect the school design.

NEW CONSTRUCTION CHECKLIST

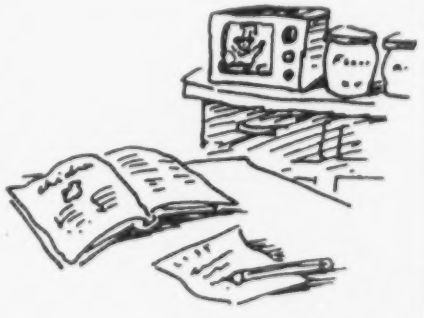
- ☐ Will owner make decisions by one person or by agreement of key staff?
- ☐ Who are the most qualified people to be involved in the project?
- ☐ Identify your needs.
- ☐ How does expansion figure into the future of the facility? Be realistic.
- ☐ What is the construction budget? Is there a percentage for food service?
- ☐ What are the time constraints?
- ☐ Make a list of equipment that will be used from other locations/schools.
- ☐ Is there other specialized equipment that will need to be accommodated?
- ☐ Who will buy equipment? Answer questions starting on page 3-20.
- ☐ Complete "Getting Started" Facility Data Sheet on page 3-3.
- ☐ Assemble the project team.
- ☐ Assign staff to the new facility if possible and include them in decision making.
- ☐ Identify all reviewing agencies for the project and their submission requirements.
- ☐ Is the equipment selected for purchase flexible in usage in the future?
- ☐ Is natural gas service adequate in pressure and flow to meet requirements?
- ☐ Can utilities be located away from path of future growth?
- ☐ Can mechanical systems and equipment installations be located away from path of future growth?
- ☐ Has 25% spare capacity been provided in electrical panel box?
- ☐ Review sample health department checklist in Chapter 3.
- ☐ Is the grease separator adequately sized? Is the separator located to serve the kitchen properly (to meet code)?

Like many professions, architecture has its own unique methods for conveying information. Architects communicate using drawings and words to describe how a building will look and function. What an architect does can be a pretty complex process. In addition, the drawings he/she prepares can be complicated and difficult to understand. On the other hand, non-architects must clearly understand what an architect does and what the drawings say in order to give the architect feedback and make sure that they are satisfied with what the architect has done.

Since this handbook is about food service design, let's see how the six phases to the services an architect provides to the client can be compared to preparing a meal:

THE ARCHITECT'S WORK	PREPARING A MEAL
Programming	**Planning a meal and making a shopping list**

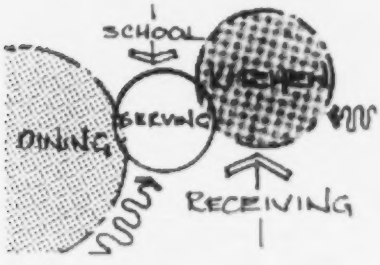
The most preliminary phase is to understand what the client needs in terms of space and function. The architect understands these needs through information the client provides so that the building reflects what the client wants. The program simply catalogues the client's needs, wants and budget.



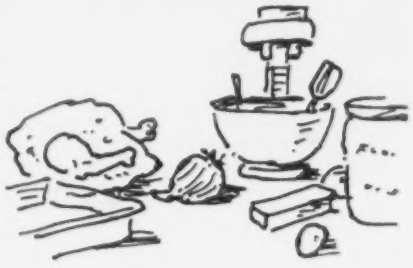
Schematic Design

Next, the architect must figure out the best approach to realizing the program. Schematic design sketches reflect the architect's initial reaction to the program. These drawings show the general arrangement of spaces and their relationship to one another. These sketches commonly take the form of bubble diagrams.

Bubble diagram



Gathering the ingredients and kitchen utensils together



Design Development

These drawings are drawn to scale and show the complete building and all spaces and functions required by the program. The design shown in the drawings is flexible, in that it allows for the architect and client to make changes and revisions. These drawings include plans, sections, elevations, and sketch details. They also begin to show work of the consultants such as mechanical, structural and electrical considerations.

Making work area preparations and measuring out the ingredients

Construction Documents

Final drawings are produced by the architect as a detailed set of instructions for the contractor. Written specifications are also produced which give detailed information about the quality of workmanship and materials expected. All the information relevant to the building is shown on these drawings which are issued to contractors and owners in the form of blueline drawings. They are to scale and include a complete site plan, architectural, mechanical, plumbing, structural and electrical documents.

Bidding

The architect sends out the construction documents to contractors who bid a price for the work.

Construction Administration

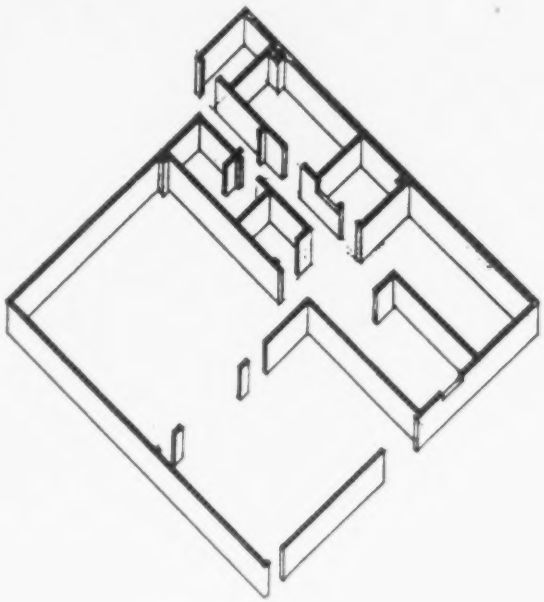
The architect observes construction through periodic site visits and answers questions from the contractor and sub-contractors related to the construction documents. Payment requests to the owner from the contractors are reviewed by the architect.

Mixing and assembling the ingredients

Pre-heating the oven

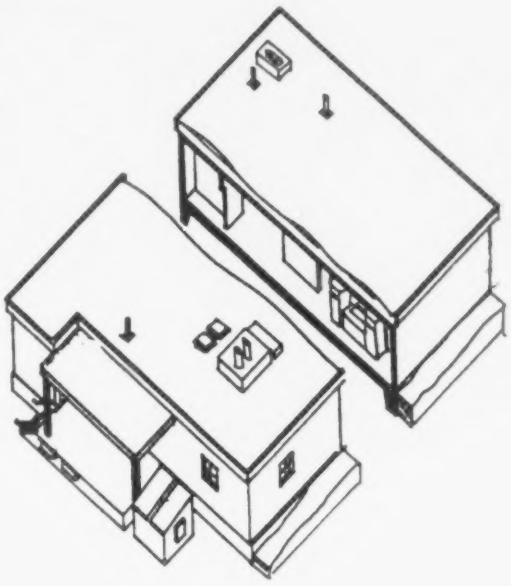
Cooking and serving the meal

The floor plan is a bird's eye view of a particular floor level of a building after an imaginary cut is made horizontally through the walls. The upper floors and/or roof are then removed so you can "see down into the building".

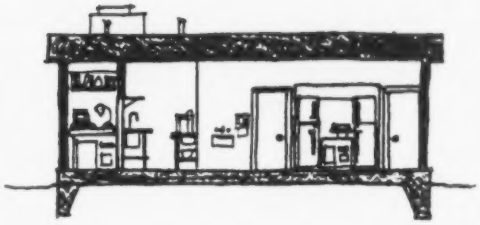


The floor plan shows the exact size and outline of a particular floor. It includes every wall, door, window, permanent fixture, electrical outlet and other proposed interior construction.

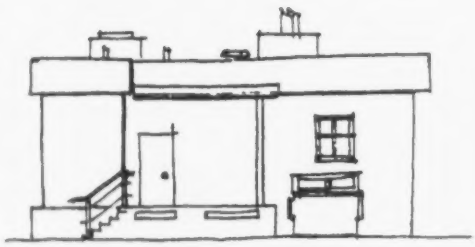
A building section is a view of a building after making an imaginary vertical cut through the building. One side of the building is then pulled away so you can see inside the rest of the building (just like looking into a dollhouse).



The purpose of a section is to show the interior space of a building: its floor-to-ceiling heights, foundation depth, framing material, wall finishes and mechanical equipment.



An elevation is a straight-on view of a building wall. This is like taking a photograph of the wall of a building. The elevations are usually oriented north, south, east, or west. The purpose of an elevation is to show the treatment of exterior or interior walls and roof.



PLUMBING SYMBOLS AND ABBREVIATIONS

●	Hot/cold water and gas connection
○	Drain - directly connected
○- - -	Drain - indirectly connected to floor sink
▨	Floor sink
⊕	Area floor drain
3	Vertical dimension rough-in symbol
HW	Hot water
CW	Cold water
H&CW	Hot and cold water

MECHANICAL SYMBOLS AND ABBREVIATIONS

	Exhaust duct connection at ventilator or dishwasher
	Supply duct (make-up air)
	Ceiling mounted make-up air diffuser
CFM	Cubic feet of air per minute
FPM	Feet per minute
SP	Static pressure

ELECTRICAL SYMBOLS AND ABBREVIATIONS

●	Point of final connection to equipment
J	Junction box
	Duplex convenience outlet
	Special purpose outlet
3	Vertical dimension rough-in symbol
J-Box	Junction box
DCO	Duplex convenience outlet
SPO	Special purpose outlet

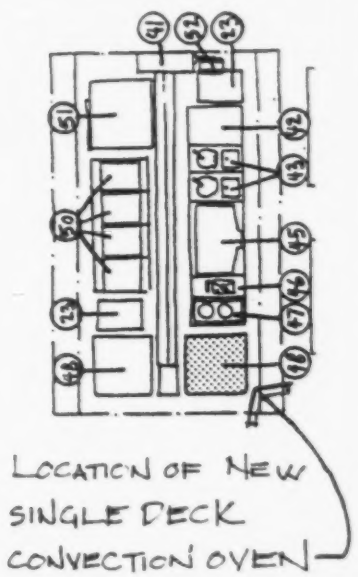
WHAT ARE SPECIFICATIONS?

Don't confuse the architect's specifications with educational specifications (program). You can think of architect's specifications (specs for short) as the written instructions that go along with a map when you give someone directions to get to your house. The map (which is like architectural drawings) gives a good indication of distances and overall relationships of one place to another. The written directions are more detailed and show or tell of things not seen on the map.

Generally, a project needs both drawings and specifications to give the most complete picture of what is needed. In other words, specifications complement the drawings. Let's compare what each system provides:

Drawings	*Specifications*
Extent, Size, Shape	*Type*
Quantity	*Quality*
Location and Relationships	*Quality of Workmanship*
Detail and Overall Dimensions	*Methods of Fabrication and Installation*
Schedules of Equipment, Finishes	*Gages of Manufacturer's Equipment*
	Test and Code requirements

What a drawing might show:



What the specs might be:

Provide one (1) each CONVECTION OVEN; ABC RANGE COMPANY Model Number 123-456-A or equal. Provide with all standard features and the following:

a. Four (4) 25" high stainless steel legs with adjustable stainless steel feet.

b. Stainless steel left and right sides.

c. Stainless steel louvered rear panel.

d. Oven control package "E."

e. Electrical requirements:

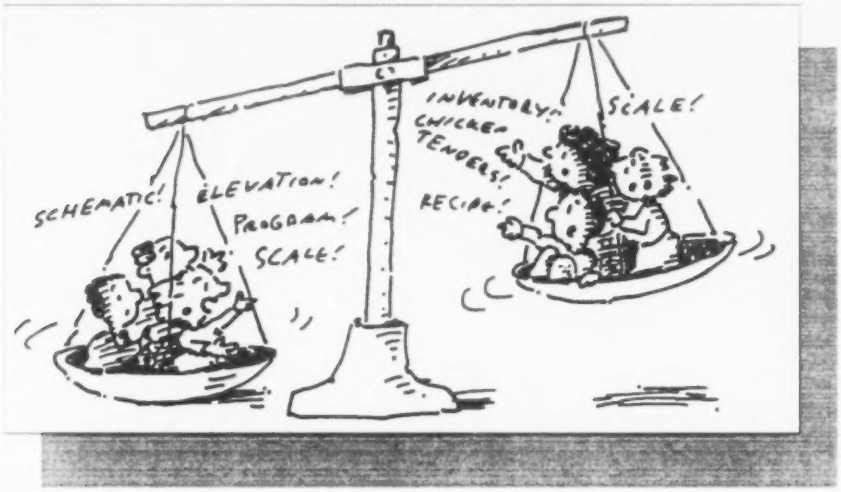
120 volt 60 cycle single phase @ 6.0 Amps

f. Plumbing requirements:

3/4" Gas @ 60,000 Btu/HR.

SO, WHAT'S IT LIKE TO COOK FOR 500?

Just as architects speak and communicate in a language not always recognizable to non-architects, food service personnel often have their own lingo to describe what they do or the equipment they work with.



And while most of us are familiar with cooking family meals in our kitchens at home, few of us have any idea what it's like to cook for 500 so we thought it would be helpful if we could travel through a day in the life of some food service workers. The following cases were written by school food service managers and portray actual events in their respective schools.

Case No. 1 - "Sure I Can Juggle" or "A Day in the Life of an Elementary School SFS Manager"

- Sign in ready for work (hair net on, proper uniform and nonslip shoes).
- Open all doors to pantry, freezers, coolers, storage rooms, etc.
- Check temperatures of freezers and coolers and make necessary calls to maintenance if any are not working.
- Call a substitute if a regular employee calls in sick.
- Assist with and/or start preparing breakfast.
- Work breakfast line by replenishing food and cashiering if necessary.
- Mop up spills and supervise students that are sent to "help" clean.
- Smile at and hug sad or upset students who come into the cafeteria.
- Answer teachers' and parents' questions as to why we can't have chicken tenders or gourmet desserts everyday.
- While completing breakfast, answer employee questions about daily production.
- Check needs list and inventory before starting an order sheet.

- Check end of breakfast leftovers and cleanup procedures.
- Check meal payment collection.
- Work with teachers and administrators concerning field trips, special functions, nutrition classes, etc.
- Answer phone calls from parents who didn't receive the monthly menu that was supposed to be sent home with each student.
- Talk to the irate parent who knows little Johnny brought in his check for the month or that Susie had enough for one more meal left in her payment account.
- Research files for 30 minutes or more to find the check from little Johnny. Being unable to find the check, call the parent back to find out that she located it on the kitchen counter at home.
- Check free and reduced meal applications.
- Enter information into the computer as needed--yes we now have to have a computer in order to keep up with all the information that USDA requires.

- Work on planning menus for lunch and breakfast.
- Conduct and document in-service classes for food service employees.
- Check food production throughout meal service.
- See that all deliveries are checked in and stored properly.
- Check sanitation solutions for all cleaning cloths to make sure the chemical to water ratio is correct.
- Check all brooms and mops to make sure they are not touching the floor.
- Take food temperatures throughout meals.
- Prepare a test tray of foods served for the day and maintain for 72 hours in case there is a complaint about food borne illness.
- Take care of all emergencies:
- The dishwasher broke. We haven't enough disposables. Call the manager at the school closest to my school to see if I can borrow some disposables. Hop in the car, get disposables, return just as the disposables on hand ran out and the "lifesaver" maintenance man repaired the dishwasher.
- A favorite food item ran out on the serving line and must be substituted from another favorite food item. Even though there is plenty of "real" food (pork chops and a full salad bar left) to choose from, Johnny tells mom that all the

food ran out and he didn't get any food at lunch.

- A student vomits or wets his pants on the cafeteria serving line. Since by health regulations, food service workers can't handle food and clean up waste, the custodial staff is paged. "It" is sprinkled with vomit control (the odor of which is probably worse than "it") and wait 15 to 30 minutes for the custodial staff to clean "it" up.
- The city calls during lunch to let you know the water will be turned off in the next 15 minutes. (Usually there is no warning for water, gas, or power.)
- One of the teachers forgot to turn in request for field trip meals and needs them by 9:00 A.M. today.
- The dumpster was not emptied today. The garbage disposal company is called and the dumpster is finally emptied after the health inspector takes off points for the garbage piled on top with the lid opened.
- Lunch is over and it is time for a 30 minute lunch break.
- After two or three interruptions, I give up trying to eat in the cafeteria and return to my office where I answer the phone and start daily reports and grab a bite or two on the side.
- Start food production records after lunch. To meet USDA requirements, a production record must be completed for each meal plus anything sold a-la-carte and another one for the salad bar.
- Complete or check commodity inventory records. (Commodity deliveries arrived at the same time the regular delivery truck arrived. Make note of the item, cost and amount delivered.)
- Check reports generated by the computer.
- Complete a daily revenue report that must match the bank deposit.
- Complete the daily participation report where total student meals are broken down into categories of Free, Reduced, Full Price Students and Adult meals for breakfast and lunch.
- Check to make sure employees are on schedule for clean up and preparation for the next day or two's meals.
- Run debit reports to give to the principal and teachers for student's that owe money.
- Total and send end of the month reports to the central office.
- Check invoices item by item for correct pricing and sign invoices before sending to the central office.
- Decorate the cafeteria for special promotion days.
- Teach nutrition classes.
- Guide students through the kitchen for a tour.
- Demonstrate food preparation to students and explain the role of yeast.
- Help students prepare healthy snacks.

- Arbitrate between employees who do not work well together.
- Talk to parents and teachers who complain about an employee or the food.
- Meet with and talk to student nutrition advisory committee.
- Talk to parents at kindergarten orientation.
- Set up time to receive prepayments and free and reduced meal application prior to school starting for the convenience of the parents and teachers.
- Enter all new students into the computer and delete withdrawn students.
- Sell disposable cups, spoons, forks, ice, etc., to teachers.
- Check freezer and cooler temperatures at the end of the day.
- Back-up and shut down the computer.
- Lock all doors and go home.
- Answer phone calls from teachers, parents and food service employees who forgot to or could not get to talk to you during the day.

Case No. 2 - "You know that thing called Murphy's Law?...."

A day in the life of a lunchroom manager can be, and is, very exciting. You never know what to expect. I remember one day when it was snowing and we weren't sure if we would have school. I came on to school to check on the freezer. Thinking I would only be there a minute or two, I left my car running to keep it warm. Yes, you guessed it; I locked my car keys in the car. Fortunately, with the right help, I was able to rescue my keys. This was suppose to be my little secret until my assistant decided otherwise. Oh yes, we did have school.

As a new manager, you have so much to learn. One day I was supposed to make banana pudding for lunch. Never in my life had I seen so many cases of bananas and vanilla wafers. I made so many pans of pudding I felt as if I had made it for everyone. When my first grocery order came in, I had over ordered in a big way. By the end of the year we had used up everything, except the baking soda that we had for a long time. My principal wanted me to make salad plates for the teachers since we did not have a salad bar, I did just as he asked. I had 82 salad plates in bun pans iced down by lunch time. They were all over the place. I thought I had to have them all out; not realizing that I could have left most in the cooler until needed. The health inspector came that day and couldn't believe it!

MURPHY'S LAW CONTINUES

One morning, I didn't check the setting on the mixer before use. I thought the person before me had turned the dial back to #1. Instead, she had left it on #3. I turned it on and flour went all over the kitchen. I was so mad at myself that I had to stomp my feet several times; of course, I then had to clean up the mess.

Managers and their delivery man get where they know what each other means by the way an order is given. That was my case. However, I had a substitute bread man and I told him I needed 60 steak buns for the next day. Bright and early the next morning, my regular man came. Not with 60 buns but with 60 trays. Fortunately for me, he took back all but the 60 that were needed.

The children can really keep you laughing. One day during serving, a first grader heard a police siren go by as she was getting her tray. She looked up at us and said, "I know that policeman: he came and got my name." Last fall, a child got sick at lunch and vomited in her tray. From that day on, no one wanted a yellow tray. They would go 10-12 trays down the stack to get a green tray. If you asked the children why, they immediately told you it was because someone had gotten sick in that tray!

I had borrowed some cheese from another manager and decided to return it on my way home one afternoon. When I arrived, she was talking to some visitors and all her workers had left. Since she knew I was coming, I decided to just put it in her cooler without disturbing her. When I got in the cooler, the door closed. This was a new cooler, unlike mine. It had no handle on the inside; just a smooth door. Well, I pushed and pushed, to no avail. I then began to beat on the door and yell, I was afraid they would lock up the place with me in the cooler and there I'd be for the weekend. Hearing the noise, they came to see what was wrong with the cooler.

Case #3 - "Don't worry..."

My day usually starts around 6:30. Why so early... Breakfast is the first meal of the day. We feed an average of 120 students per day for breakfast. There are students who are bused in from out in the county. Breakfast is served around 7:30.

After breakfast, the busiest part of the day begins. There are four cafeteria workers. Each one is assigned a different task each week, which includes bread, vegetables, desserts, salad bar, meat, etc. After the lunch count has been tallied the task begins.

Everything starts out smooth, everyone is in place going about what has to be done. "Mrs. Robb" is one of my workers. "Mrs. Robb we are out of flour and I have to make rolls for 500 students," yells one of the workers. My response is usually "out of what?" "Don't worry," I will yell in my authoritarian voice. "I'll call Mrs. Brown to see if there is any in storage. Oh! I just remembered Mrs. Brown is out of town for 2 days at a nutrition work shop."

"Hold on girls I'll get some from one of the schools." What do you know, I have saved another day. The day moves on rather smoothly after that near disaster. Lunch has been served and is over. The clean up detail begins. Dishes are stacked high in the window and the machine goes out. This would not be a big deal if we didn't have to use the cafetorium this afternoon for a county- wide faculty meeting. Why me?!! This is my lucky day!!! Our maintenance supervisor is here eating lunch and he comes to the rescue. We finally finish our day, I checked the menu and the ingredients to make sure we have everything we need for that big turkey and dressing dinner tomorrow. Everything is ready. We say our goodbyes, see you later and head for the door.

At 6:00 PM I get a call from one of my workers and she can't come in tomorrow. "No problem," I say,"we have plenty of subs." For the next 2 hours I call people who have submitted their name to be a cafeteria sub; but to my surprise none of them can come tomorrow. What do I do now? Keep calling. Finally I got a sub and was saved again.

It's 10:00 PM now and I am in bed thinking back on my day. Tomorrow has to go smoother. I doze off and when I wake up to turn off the TV, I also turn off the alarm clock. It's 5:00 AM and my day has begun. It sure seems like I just left Hillcrest High School.

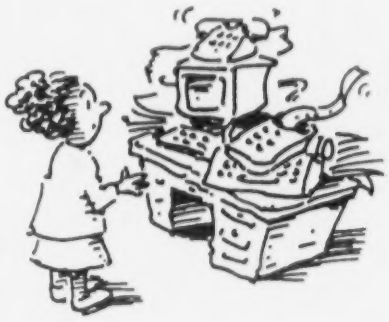
Case No. 4 - "In search of the perfect day..."

My day begins at 6:00 AM. Today when I opened the door the kitchen was already at 80 degrees. So, you know how my day was starting out, with these warm temperatures, and nothing turned on yet or windows to open. I go around unlocking the freezer, cooler and stockroom, recording the temperatures of each

one as I go. You know the rule. Then I go to check the milkbox on the serving line, just as I lift the lid, the telephone rings. It is a mother wanting to know what we are having for lunch today. You know, one of those people who calls everyday, instead of writing it down for the week. So, while I am in the area I turn on the ovens and the stove.

By this time the deliveries start to arrive. Items are marked out, the very ones I need for the menu that next day. The ladies also start arriving for work. We start trying to decide how we are going to cook everything on the menu that day, since the maintenance men have not finished installing the steamer, that is connected to three pieces of my cooking equipment. This just adds to the problem of trying to have four hundred and fifty lunches ready by 10:00 AM to go the distance to our satellite schools. Now we are ready to fix another 600 meals for our own hungry students and faculty.

I sit down to eat lunch and the phone rings; it is one of the ladies at the satellite school wanting to know if the chips go with the hamburgers and sandwiches. I finish lunch and I sit down at my desk located in the corner by the door that everyone comes in and out of to the kitchen. My desk is not large enough for a typewriter, telephone, and adding machine, all important things in order to complete my reports. In just a few years I will need a computer to fill out more new forms; papers will be everywhere. Where will I put another machine?



Well, we have the children fed and the money counted and are ready to go home. Guess what? One of my deliveries has not arrived. I call the other schools to see if the truck is at one of them, they have not seen it either. I lock up the cafeteria and go home. At about 4:00 PM, the telephone rings; it my custodian telling me my delivery is at the school. He wants to know where I want it all put? You know what I would like to say, but I am nice because I really need those supplies. I ask him to count the items, check for any damages, and put the frozen items in the freezer and the other items in the stockroom. Boy, I sure hope there is enough room in that tiny freezer!

You know why I remain a cafeteria manager? I am still waiting for that one day when supplies are right and equipment works and all my workers are present and ready to work. You know that perfect day. All kidding aside, I enjoy my job and the challenge of trying to do a good job under adverse conditions and still learn something new each day. So, I am ready for the future wave of child nutrition and new forms.

APPENDIX

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GLOSSARY

AC: Alternating current; air-conditioning.
ADA: Average daily attendance. Also, Americans with Disabilities Act.
ADP: Average daily participation.
AGA: American Gas Association(seal of approval required for gas equipment).
AIA: American Institute of Architects.
Air curtain: A device mounted above a door which discharges air at a downward velocity to prevent insects from entering the building.
A la carte: Food items sold individually and separate from the meal at a separate price for each item.
AMP: Ampere, the standard measure of the strength of an electrical current.
ASME: American Society of Mechanical Engineers(seal of approval required on steam equipment).
ASHARE: American Society of Heating, Refrigerating, and Air Conditioning Engineers.
ASTM: American Society for Testing and Materials. (Sets standards for materials)
Back shelf ventilator: A system for catching and removing heated air and steam close to the point of origin (can be used instead of a canopy or hood when no top-surface cooking is being done).
Base kitchen: A kitchen that prepares food for other schools to serve.
Bakers table: Table whose top has 4 to 6 in. high curbing along the rear and sides to minimize spillage of flour onto floor during preparation.
Bin: Semi-enclosed, rectangular or round container, open on top, with or without lift-off, sliding, or hinged cover.
BHP: Boiler horsepower. Used for rating steam equipment.
Blower coil: The part of a refrigeration system that "blows" the refrigerated air into the cabinet or walk-in box.
Braising Pan: A large griddle with 7" to 9" sides mounted on pivots allowing it to tilt and dispense the food cooked in it.
Btu: British thermal unit. The amount of heat required to raise the temperature of one pound (0.5 kilogram) of water 1 degree Fahrenheit (0.6 degree Celsius).
Building Code: A document adopted by the local authority (city or state) which is enforcable by law.
Buffet: A variety of foods arranged on a counter for self-service and selection.
CAD: Computer aided design.
Calorie: A unit for measuring heat. A unit of energy-producing value in foods.
Can rack: A special rack used to dispense standard tin cans (such as #10 cans) one at a time.
Centimetre(cm): A metric length equal to 0.39 inch.
cfh: Cubic feet per hour. Units used to measure the flow rate of natural gas to an appliance.
CFM: Cubic feet per minute. Units used to measure the volume of air flowing through a ventilation system.
Char broiler: A broiler with open grids over a bed of charcoal or ceramics, usually fired by gas.
Combi oven: A convection oven with a built-in steam source. Foods may be cooked with steam only, as a convection oven or a combination of both.
Compactor: A machine for crushing or compacting foodservice waste.
Condensing unit, refrigeration: A mechanical compressor used as an air- or water-cooling device.
Condiment: Something usually pungent, acid, salty, or spicy added to or served with food to enhance its flavor. Seasonings like pepper, salt, catsup, mustard, relish, etc.
Contract feeding: Food service provided through a contract with an outside catering

firm; may include outside management, personnel and food purchasing.

Convection oven: An oven, gas or electric, in which the heat is circulated through the chamber by a fan or blower system.

Convenience foods: Food items that have been processed before delivery and that may or may not require additional preparation before serving.

Cover: A single place setting.

Cubic footage: Gross interior space. The term is often used in describing refrigerated and freezer space.

Cuisine: A distinctive method of preparing and serving food.

CW: Cold water.

Cyclical Menu: A menu which changes in a prescribed fashion and repeats itself regularly in a cycle.

dB: Decibels, a measure of sound levels. A level below 50 dB is a quiet level, and a level above 90 dB is a danger level.

DC: Direct current.

Design: A scheme for developing the overall function and the entire concept of a food service facility.

Dining area: The area provided for the consumption proceeding from the serving area to the eating area and including that eating area.

Dishwasher: A machine designed to automatically wash, rinse and sanitize food service utensils.

Dishwashers are available in the following types:

Undercounter: The dishwasher is located below the counter. Utensils are placed in a 20"x20" rack and washed one rack at a time. Cycle time is approximately 1-1/2 to 2 minutes per rack.

Door type: The dishwasher is located at counter level. Utensils are placed in a 20"x20" rack washed one rack at a time. Cycle time is approximately 1 minute per rack.

Conveyor: The dishwasher is located at counter level. Utensils are placed in a 20"x20" rack and inserted into the dishwasher which automatically convey the racks through the dishwasher. Capacity ranges from approximately 125 to 270 racks per hour.

Flight type: The dishwasher is free standing and loose utensils are placed directly on a peg conveyor belt and automatically conveyed through the dishwasher. Cups, glasses and flatware are conveyed through in 20"x20" racks. This type dishwasher can be used for self-bussing.

Circular conveyor: A conveyor dishwasher is connected to a circular endless dish-table. Loose utensils are placed directly on a peg conveyor belt or racks and automatically conveyed through the dishwasher. Cups, glasses, and flatware are conveyed through in 20"x20" racks. If utensils are not removed at the end of the sanitizing cycle, they continue on the conveyor and are washed again. This type dishwasher can be used for self-bussing.

Dish-washing area: The space provided for washing, sterilizing, and drying the dishes, equipment, and utensils used in preparing and serving food.

Disposables: Dishes, glasses, cups, trays, pans and table accessories intended for single use before throwing away.

Disposer: A motorized waste grinding device connected to a sink to reduce the waste, allowing it to pass through the drain.

Donated foods: Foods purchased and distributed by the U.S. Department of Agriculture.

Dry storage area: The space provided for the orderly storage of consumable items that do not require refrigeration and for storage of paper and disposable items used in food

service.

Dunnage rack: A mobile or stationary platform used for storing bulky items, stacked cases, or sacks.

Employee facilities: Toilet areas, storage of personal items, area for changing clothing.

FC: Footcandle. A measure of the luminance (brightness) of a surface.

FD: Floor drain.

Finishing kitchen: A kitchen that receives prepared foods for reconstituting or heating, assembling, portioning and serving.

Fire suppression system: A system of pipes and nozzles found in the exhaust hood over the cooking equipment. The system is automatically activated when fusible links melt due to the detection of fire. Most common types are dry and wet chemical agents or a water "mist" or "fog."

Flow diagram: A graphic representation of the movement of food products through the preparation and serving process.

Food production center: A facility in which food is prepared to be served at another location.

FNS: Food and nutrition services.

Food distribution agency: Agency in state government responsible for commodity cases.

Freezer: Storage space at a temperature of zero degrees Fahrenheit (-17.8 degrees Celsius) or below.

Fryer: A floor- or bench-mounted unit for cooking in deep fat or oil.

General contract: The construction contract. All equipment that is to be attached to the building is usually included in the general contract.

Grease filter or extractor: A rectangular or round frame with several layers of wire mesh that is mounted in the exhaust system for removing grease.

Griddle: A stove-top cooking unit with extra-thick steel plating.

HACCP: Hazard Analysis of Critical Control Points. This is a system for monitoring the food service process to reduce the risk of foodborne illness. NACCP focuses on how food flows through the process--from purchasing through serving.

Heat lamp: A heating device, usually infrared to produce high heat, used to hold food hot for service. They are available in various types and sizes.

HP: Horsepower.

HW: Hot water.

Ice dispenser: A machine that dispenses ice directly into a container. They may be manual fill or automatic with a connected ice machine.

Ice machine: An automatic machine that freezes water into a variety of shapes and styles; usually cubes, tubes, or flakes.

IES: Illuminating Engineering Sociey.

Ingredient bin: A bin, usually mobile on casters, to hold bulk quantities of ingredients such as flour, corn meal and sugar.

in. W.G.: Inches (Water Gauge). Units used to measure the pressure inside of duct work.

Kettle, steam-jacketed: A large cooking kettle that in use has steam between its inner and outer walls.

Kiosk: A decentralized dispensing or serving area that is sometimes mobile.

Kitchen: A room or some space with facilities for preparing food.

kw: Kilowatt.

Layout: The arrangement of physical facilities and equipment within an area.

Loading area: The space outside the kitchen that is used for the pickup and delivery of food and non-food items.

Lowerator: Spring-loaded containers for dishes, trays, cup racks, glass racks, etc. Dis-

pensers are self-leveling and may or may not be heated.

Maintenance area: The space provided for holding and disposing of refuse and for washing equipment that is used for this purpose.

Make-Up Air: Ventilation air introduced into a building to replace air exhausted by a fan or combustion.

Metre(m): A unit of length equal to 39.37 inches.

Microwave oven: An oven which heats (or cooks) food rapidly by using microwaves. Microwaves are a radiant energy similar to radio waves with frequencies around 555,000 cps.

NEMA: National Electrical Manufacturers Association.

NFPA: National Fire Protection Association. This organization publishes NFPA Bulletin 96, which may be obtained from the local fire-protection agency.

NSF: National Sanitation Foundation. This organization's seal of approval certifies compliance with specified sanitary design requirements.

ODFM: Office of District Facilities Management

Office: The space used by the food service manager for general management duties such as recordkeeping, menu planning, ordering, filing, money-handling, administration, consultations with food service and other personnel and frequently meeting public visitors.

On-site kitchen: A kitchen that prepares and serves food at the same location.

Oven: Fully enclosed insulated chamber with gas, electric, or oil-fired heat, provided with thermostatic control.

Portion Packets: Usually referred to as PC's; individual servings in disposable packets of crackers, jelly, syrup, mustard, ketchup, etc.

Pot/Pan washer: An automatic machine similar to a dishwasher designed specifically to wash and sanitize pots and pans.

Preparation: The space provided for the total processing of foods from raw to ready-to-eat. This may involve baking, boiling, steaming, re-heating, raw vegetable and fruit preparation. Also includes the proper equipment to cleaning space utensils and equipment used in food preparation.

Processor(Food): A small motorized appliance used for the high-volume chopping, dicing, slicing of fruits and vegetables. Some are equipped with a mixing bowl attachment for pureeing of ingredients.

Proof box or cabinet: An enclosed area with a heater and humidifier.

Prospectus: An operational model of the food service areas.

psi: Pounds per square inch, the units used in measuring steam pressure.

Pulper/extractor: A large waste grinding device similar to a disposer that grinds the waste into a pulp or slurry. The slurry is then transferred to an extractor where the water is pressed out. The semi-dry material is then discharged into a waste container. A pulper/extractor can reduce waste volume by as much as 80%.

Punch list: A list of the problems or the incomplete work at a construction site that must be fixed before the building is accepted as complete.

Quick-disconnect: A pipe coupling with an internal shut-off valve allowing equipment to be easily disconnected and moved for cleaning or serivce. Usually with gas and water supplies to equipment.

Range: A piece of equipment used for top-surface cooking and that has an oven at the bottom.

Receiving kitchen or school: The school kitchen that receives prepared foods from another preparation center (also referred to as serving kitchen).

Receiving: The space provided for the unloading of food and non-food products from district and/or commercial trucks and conveyances; checking orders for quantity and specified quality; checking invoices for accuracy.

Receiving scale: A scale located in the receiving area of the kitchen to weigh-in delivered goods. Sometimes referred to as a "back door cash register" since it discourages the practice of cheating on delivered weights.

Refrigeration: The areas or units that keep food at a temperature below 45 degrees Fahrenheit (7.2 degrees Celsius), including refrigerators, coolers and freezers.

Refuse area: The area including space for the storage and washing of garbage cans and dumpsters.

SBCCI: Southern Building Code Congress International. (Organization which writes a model building code).

SFS: School Food Services of Department of Education.

Self-contained kitchen: A kitchen in which food is prepared and served on the premises (refered to in this document as an on-site production kitchen).

Serving area: The space where food is served to the customer. It includes the display of various food offerings, both hot and cold, and the holding and replenishing of these food items as needed.

Scale: The relationship of the size of a floor plan drawing to actual floor dimensions. The ratios most frequently used are 1/8 inch (0.3 centimetre) equals 1 foot(30 centimetres) and 1/4 inch(0.6 centimetre) equals 1 foot (30.5 centimetres).

Sink sanitizer: A water heating device, usually electric, that maintains the water temperature at sanitizing temperature of 180° F. or above.

Slicer: A motorized food slicing device with a circular cutting blade. May be manually operated or automatic.

SMACNA: Sheet Metal and Air Conditioning Contractors National Association.

Soffit: A sound-absorbent material that can be put above the serving line to reduce noise and improve the appearance of the serving area.

SP: Static (air) pressure.

Steamer: A cooker with compartments in tiers that cooks with low-pressure steam.

Steam-jacketed kettle: A kettle that holds steam between the interlining and the outer shell.

Storage: The storage of consumable food (dry, frozen and refrigerated) and non-consumable products in case lots, bulk packages and broken case lots on shelving and pallets, or dunnage racks. Also includes storage of toxic chemicals and cleaning supplies and paper goods.

Template: A pattern, usually to a set scale.

Thermostat: An automatic device for regulating temperature on cooking equipment. Regular thermostats are usually accurate + or -°25 F. Solid state thermostats are usually accurate ∓ or - 5 F.

Transportation: In the event food is prepared in one place and served in another, transportation activities include moving food and non-food products, can storage and cleaning, return of soiled ware for sanitizing or disposal and the collection and disposal of plate waste.

UL: Underwriters' Laboratories, a testing agency that issues a seal of approval.

USDA Meal Pattern: This term was changed by the USDA to school lunch meal patterns. It describes a group of foods that meets federal regulations for a nutritionally adequate lunch.

Ventilator: A term commonly used to describe the exhaust hood over the cooking equipment. Ventilators are usually provided with fresh air supply grills to replace or "make-up" the air removed by the exhaust fan.

Vertical cutter-mixer(VCM): A machine that cuts and mixes at high speeds.

VCP: Visual comfort probability.

Workstation: The area and equipment used to do similar work.

■ **Kitchen Floors, Walls and Ceilings**
- ☐ floors of easily cleanable construction
- ☐ floor and wall junctures coved
- ☐ walls smooth and easily cleanable
- ☐ walls of approved material
- ☐ ceilings of approved material

■ **Fly, Gnat and Mosquito Control**
- ☐ all outside doors of self-closing type or equipped w/ approved fly fans
- ☐ all operable windows screened with 16 mesh screen wire

■ **Facilities for Kitchen Personnel**
- ☐ adequate number of toilets
- ☐ proper vestibule, floor drains.
- ☐ hot and cold water supplied to lavatory, through a mixing faucet (110 °F. minimum for hot water)
- ☐ toilet ventilation in accordance with regulations
- ☐ dressing area with lockers provided
- ☐ adequate handwashing lavatories in food preparation and utensil washing areas
- ☐ sanitary towel and soap dispenser installed

■ **Sewage Disposal**
- ☐ site approval by county health department, if septic tank and tile field proposed
- ☐ septic tank, tile field and grease trap adequately sized (approved by Bureau of Environmental Health)
- ☐ previous satisfactory operation approved by county health department, if connection to existing tank proposed
- ☐ enlargement of system, if proposed, satisfactory
- ☐ Local sewer authority clearance, if to municipal sewage system
- ☐ oxidation pond or package treatment plant, if proposed, approved by a local pollution control agency and/or sewage agency.

■ **Sewage Collection System**
- ☐ cast iron soil pipe drains beneath and to a point 5 feet beyond building
- ☐ extra heavy cast iron pipe under drives, walkways and also under buildings over one story in height
- ☐ 4-inch and 5-inch pipe, minimum 1/8-inch per foot fall
- ☐ all pertinent invert elevations furnished
- ☐ fittings, venting, materials, joints, traps, clean-outs, back-water valves, hangers, supports in accordance with National Plumbing Code

■ **Water Supply and Distribution System**
- ☐ water from approved source
- ☐ system conforms to Southern Plumbing Code
- ☐ no back siphonage potential
- ☐ insulation connections provided between pipes of dissimilar metals
- ☐ specifications call for adequate system
- ☐ disinfection and sampling
- ☐ all plastic pipe bears NSF Seal of Approval

■ **Heated Water Supply**

☐ primary water heater (140° F.) adequate
☐ 180° F. water to hot water sanitizing warewashers adequate
☐ booster heater adequate size
  ☐ equipped with pressure-reducing valves (15 - 25 psi)
  ☐ equipped with air cushion chamber fitting
  ☐ located adjacent to dishwasher (within 5 feet)
☐ recirculation pump and necessary controls specified if generating system more than 25 feet from dish washer or dishwasher's booster heater
☐ separate hot water operating and distribution systems for kitchen

■ **Kitchens and Lunchrooms**

☐ plumbing satisfactory
☐ floor drains:
  ☐ where needed
  ☐ in walk-in coolers, equipped with a backwater valve that is accessible for inspection and maintenance
☐ floors graded to drain
☐ lavatory with mixing faucet (with cold and 140°F. water) in working area
☐ service sink or mop basin (with cold and 110°F. water) accessible to working area
☐ dishwashing machine:
  ☐ properly sized
  ☐ timed-automatic, or larger
  ☐ automatically dispensed detergent and sanitizer
  ☐ pressure/temperature gauge on final rinse
  ☐ meets requirements of Regulation 61-25
  ☐ equipped with thermostatically controlled wash tank heating element
  ☐ 1/4" i.p.s. gauge cock for checking manifold pressures
  ☐ pressure gauge where water pipe enters rinse manifold
  ☐ thermometer where water pipe enters rinse manifold
☐ other dishwashing facilities:
  ☐ 3-compartment sink of at least minimum size (large enough to immerse at least 2/3 the largest utensil)
  ☐ adequate drainboards, or dishtables, provided at both ends of sinks
  ☐ dishbaskets provided for 3-compartment sink when hot water sanitizing is used
  ☐ sinks, dishtables, and drainboards, constructed of approved materials
☐ storage shelving at least 6" above the floor
☐ storage room flats on casters

■ **Design, Construction, and Installation of Kitchen Equipment and Utensils**

☐ counter-mounted equipment sealed to counter or mounted on 4" legs
☐ floor-mounted equipment easily movable, sealed to floor, on raised platforms, or on 6" legs
☐ equipment sealed to wall or to adjoining equipment, or space to facilitate easy cleaning

- ☐ aisles, or work space between equipment and between equipment and walls of sufficient width (double aisle - 60" min; single aisle - 30" min)
- ☐ existing equipment of satisfactory construction and condition
- ☐ adequate utensil and kitchenware storage area available
- ☐ counter tops, table tops, cutting boards, etc., of suitable materials
- ☐ effective, easily cleanable, sneeze guards or other counter protective devices (self-service in K-5 schools requires 27"-29" counter heights)
- ☐ adequate facilities for maintaining food at hot or cold temperatures
- ☐ running water - dipper well provided w/ air gap and indirect drainage

■ **Kitchen Ventilation**

- ☐ if range hood used, properly sized (minimum 6" overhang each side)
  - ☐ adequate make-up air provided if exhaust exceeds 1500 CFM
  - ☐ fan properly sized
  - ☐ adequate number of filters
  - ☐ ducts properly sized
- ☐ if dishwasher hood used, all components properly sized
- ☐ if hoods not used, other adequate ventilation
- ☐ range hood must meet NFPA 96 criteria

■ **Can Wash and Garbage Area**

- ☐ mixing faucet for tempered water in can-wash area
- ☐ drain correctly located
- ☐ floor slope to drain 1/4" to 5/8" per foot
- ☐ can-wash drain discharges through grease trap if final effluent to septic tank
- ☐ outside garbage cans stored at least 12" above ground or on concrete slab

General Project Information **Date:**

Project name

Address

School district

Contact

Address

Phone

Fax E-Mail

School Food Service Director

Address

Phone

Fax E-Mail

Architect

Contact

Address

Phone

Fax E-Mail

Mechanical Engineer

Contact

Address

Phone

Fax E-Mail

Electrical Engineer

Contact

Address

Phone

Fax E-Mail

Structural Engineer

Contact

Address

Phone

Fax E-Mail

Food Service Consultant

Contact

Address

Phone

Fax E-Mail

Project Dates

Design Completion: Bidding:

Construction Beginning: Completion:

Restrictions

Food Service Facility Budget: Other:

School and Student Information

Student ages _____ Grade levels _____

School capacity _____ Future school capacity _____

Estimated number of daily customers

	Breakfast	Lunch	Other
Students			
Staff			
Others			
Totals			

Number of lunch periods _____ Length of each session _____

Block class scheduling? ☐ Yes ☐ No

Open campus? ☐ Yes ☐ No

Student canteen? ☐ Yes ☐ No

Is service continuous? _____

Hours of service: ☐ Breakfast _____

☐ Lunch _____

☐ Other _____

Maximum seated at one time _____

Type of Food Service System

☐ On-site preparation and serving

☐ On-site preparation for on-site serving and satellite locations

Number of satellite locations _____

Meals served at each location _____

(be specific with above: describe each location in detail)

☐ Satellite - receiving/serving

☐ Bulk hot

☐ Bulk refrigerated for heating and serving

☐ Pre-plated

☐ Ready-to-serve

☐ Refrigerated for reheating and serving

Types of Food Service

☐ Traditional ☐ Self-serve ☐ Scramble

☐ Other _____

Menu

☐ Choice ☐ Limited choice

Self-service bars (check all that apply):

☐ Salad ☐ Taco ☐ Pasta ☐ Dessert ☐ Potato

☐ Other (list) _____

Serving method (check all that apply):

☐ Straight serving line for cafeteria-style service

☐ Scramble style

☐ Vending machines in food service area

☐ Window-style service

☐ Self-service speed line

Dining/eating area (check all that apply):

☐ Inside building ☐ Outside building ☐ Both

Seating capacity:

Commons area _____ Dining room _____

Multipurpose room _____ Faculty/staff dining room _____

Total _____

Preparation

Indicate products to be used and method of preparation:

Food	Basic (raw) ingredients	Mixes	Ready-to-serve
Bread (sliced, french)			
Rolls			
Muffins, biscuits, etc.			
Pastry items			

Method of cooking (check as many as are applicable):

Food	Fry	Steamer Bake (oven)	Top of Range
Vegetables			
Potato Products			
Chicken/Poultry			
Hamburgers			
Pizza			

Will batch cooking be done? _____

Fuel Selection and Utility Information

☐ Electricity

Special voltage requirements _____

☐ Gas: natural? _____ LP? _____

☐ Steam

Receiving/Waste Disposal

What size trash receptacles? _____ How many? _____

Prefered location for can wash and storage _____

Waste disposal systems to be used:

☐ Garbage disposal ☐ Compactor ☐ Pulper ☐ Cans/dumpster

Frequency of trash pick-up _____

Is trash storage space needed? _____

Recycling provisions _____

Employee Facilities

Employee toilets and lockers:

☐ Handwashing facilities/lavatories

☐ Men's and women's facilities: ☐ # of lockers each _____

☐ Unisex facility: ☐ Number of lockers _____

Number of offices required _____ Persons per office _____

Office furniture and equipment requirements:

_____

_____

_____

_____

Will a clothes washer and dryer be required? _____

Will a time clock be required? _____ Location _____

Storage

Percentage of frozen food _____

Percentage of refrigerated food _____

Special requirements:

Type of refrigeration equipment:

Refrigerator:

Reach-in _____ Walk-in _____

Reach-through _____ Roll-through _____

Freezer:

Reach-in _____ Walk-in _____

Ice cream cabinet _____ Milk shake machine _____

Ice machine _____

Dry storage requirements:

Check all disposables to be put in dry storage area:

☐ Straws ☐ Napkins ☐ Hot cups ☐ Cold cups

☐ Bowls ☐ Plates ☐ Trays ☐ Pan liners

☐ Sandwich wrap/bags ☐ Aluminum foil pans

☐ Other _____

Serving

Will cashier computer terminals be used? _____

Computers linked to a mainframe? _____

Location of mainframe? _____

Methods of payment: ☐ Cash ☐ Tickets ☐ Computer cards

Will special merchandizing be required in serving area?

☐ Menu boards ☐ Signage ☐ _____

Type of condiments provided: _____

Location of condiments: ☐ Serving counters ☐ Condiment counters

☐ Serving area ☐ Dining room ☐ Other _____

How will condiments be dispensed?

☐ Pumps ☐ Portion packs ☐ Other _____

Beverages to be offered and how dispensed:

_____

_____

_____

Extra purchase items to be offered and how dispensed:

_____

_____

_____

Type of serving pieces:

☐ Permanent ware ☐ Disposable ☐ Combination

Dish/Tray Washing

Will students self-scrap trays/dishes/flatware?

☐ Full self-scrapping ☐ Partial self-scrapping

Sanitizing System:

Trays/Dishes/Flatware: ☐ Chemicals ☐ 180° F. hot water (min)

Pots/Pans: ☐ Chemicals ☐ 180° F. hot water (min)

Use of Facility by Others

Will facility be used by outside groups? _____

Frequency of use by outside groups? _____

Times of use? _____ Typical size of group? _____

How will groups gain entrance to facility? _____

☐ Food preparation ☐ Just dining area use

Type of food preparation _____

Who (if anyone) will supervise outside groups? _____

What should access be limited to? _____

Other Considerations

Will any existing equipment be used?

If so, DHEC requires a complete written inventory which must include:

- present location of item
- name of manufacturer
- model number
- all dimensions of item (length, width, height)
- utility requirements for connection
- will school install or contractor install?
- any special requirements not listed above

Special requests for preparation or serving equipment (list items)

Special requests for overall design

Special requests for teachers and staff (list items)

Should facility be designed for future capacity?

Description of activities associated with spaces: will dining be used as a multi-purpose room? Will there be a stage?

Description of innovations or experimental ideas which might be incorporated into the program.

Method of procurement of equipment

Desired finishes for equipment and spaces

Equipment needed for each function

TWO "TOP TEN" LISTS

TOP 10 REASONS FOR ARCHITECTS NOT TO USE THIS HANDBOOK:

10. Louis Kahn didn't use it when he designed the Exeter cafeteria.
9. No pretty photos like in Architectural Record.
8. The book is inexpensive... how good could it be?
7. Can't get published in it.
6. Won't be able to take revenge for all the "mystery meat" forced to consume as a child.
5. Can't use the excuse, "but I don't know how to cook for 1 much less for 500."
4. Might discover mystery meat recipe is same as mother's meat loaf recipe.
3. Won't be able to make harassing phone calls to school food service staff complaining about why my Johnny and Susie didn't eat lunch.
2. Too easy to use... must be worthless.
1. My fee is so large, why not spend it on reinventing the wheel.

TOP 10 REASONS FOR FOOD SERVICE PERSONNEL NOT TO USE THIS HANDBOOK:

10. More fun to complain about lousy arrangement of refrigerators.
9. Will have to let architects "in on" secret ingredients of "mystery meat."
8. Water might actually be hot enough to prevent rides through the dishwasher when no one is looking .
7. Might eliminate food fights (what other entertainment do we have?)
6. Might allow more time to answer phone calls of "whiny parents" about why Johnny and Susie didn't eat lunch today.
5. Will allow more time to fill out government forms.
4. If insect screens at doors actually work, there goes the secret ingredient of our famous gumbo.
3. Will allow more time to act as hall monitor.
2. Too easy to use... must be worthless.
1. Might not be able to lock architects in freezer anymore.